Engineering *and* Maintenance

Edgemark of Quality

Tension There in Spite of Wear

Improved Frog and Crossing Hy-Crome Spring Washer. Developed to meet a long-felt need to efficiently service frog and crossing bolts.

Hy-Crome Pressure Spring. Meets Southern Pacific 1943 revised specifications, exceeding all A.R.E.A. specifications in reactive pressures.

Xtra-hy Hy-Crome Spring Washer. Meets 1948 A.R.E.A. specifications.

Hy-Pressure Hy-Crome Spring Washer. Exceeds 1933 A.R.E.A. specifications.

Standard Hy-Crome Spring Washer. The pioneer of round edge alloy-steel spring washers. Meets 1933 A.R.E.A. specifications.

Hy-Reaction Hy-Crome Spring Washer. Meets P.R.R.C.E. 7. D. Specifications.

Hy-Crome Springlox. A new type of railroad spring washer possessing unusual reaction and other features. Ask us about it.

Locomotive Hy-Crome. Especially perfected to meet the service demands of steam, diesel, electric locomotives and heavy equipment.

the RELIANCE hy-crome curve of greater reaction reduces maintenance costs

- using Reliance Hy-Crome Spring Washers on track joint bolts is a step toward economical and efficient track maintenance.
- each Reliance Hy-Crome Spring Washer has been developed as a result of almost forty years of service experience and close cooperation with railroad maintenance engineers. Each is designed and precision fabricated to meet exacting demands of high speeds and heavy axle load traffic.
- a Reliance representative will be pleased to call to talk over your track joint fastening problems and help you find a cost-cutting solution.

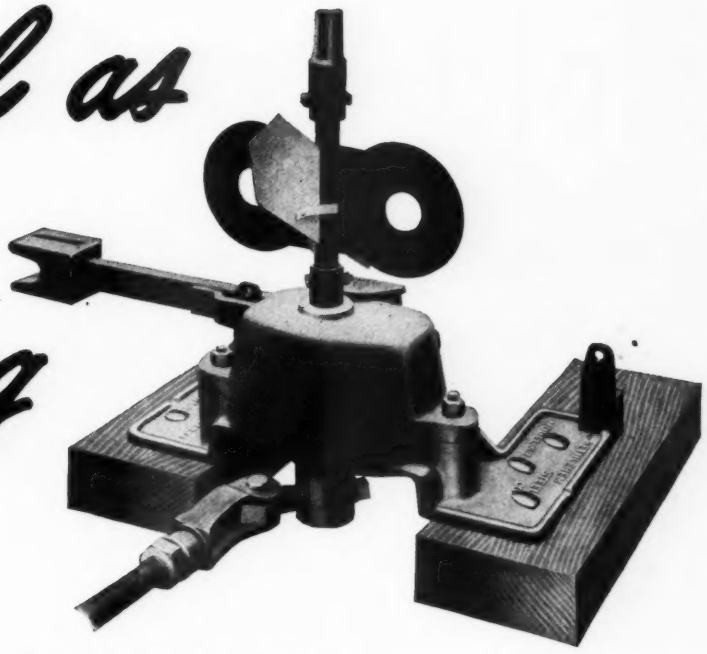
RELIANCE pioneer in railroad spring washer improvement

EATON

EATON MANUFACTURING COMPANY (EATON) RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

Faithful as a good watchdog



The Model 53 switch stand is available in two types—low with provision for standard target, and intermediate for use with mast.

Here's a switch stand that's rock-rugged and reliable. It's Bethlehem's Model 53, long a favorite of railroad men because of its simplicity and the way it stays on the job, year after year.

When you remove the cover and look inside, you'll see pretty well what we mean. This is a stand with only three moving parts—throwing lever, sliding block, and spindle. As the lever is thrown, the block transmits the force that turns the spindle and screw-eye crank. You can't help being impressed by the sturdiness of these parts and the complete absence of complicated mechanisms.

The Model 53 has especially high leverage. It's so powerful that we recommend it for both mainline and heavy yard duty. For more details of this durable switch stand, talk with a Bethlehem representative. Full information will be supplied promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

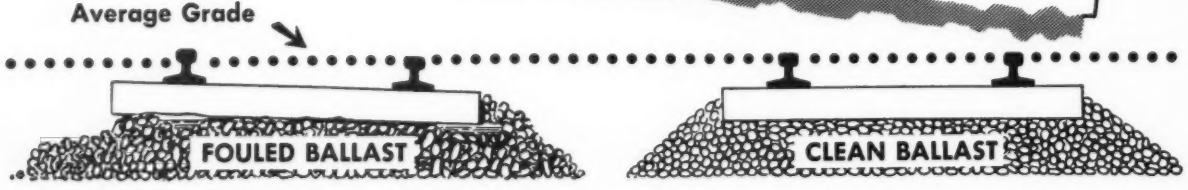
★ BETHLEHEM STEEL ★

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3,. Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 47, No. 8.

Hold Grade Levels

Yet put up to 18" of CLEAN BALLAST UNDER TIES

Matisa Ballast Cleaner is the ONLY machine capable of thoroughly cleaning ALL BALLAST—beneath ties as well as in cribs. Note that digging teeth pass clear under ties and rails, doing a COMPLETE job.



BEFORE *Matisa* CLEANING **AFTER *Matisa* CLEANING**

Whether to hold grade levels on dirty ballast, or provide a clean ballast cushion with a grade raise has long been a major maintenance of way headache. Now, with the Matisa Ballast Cleaner, you can hold the grade level (or *lower* it), yet put as much as eighteen inches of thoroughly cleaned ballast under ties!

Matisa cleaning—and *only* Matisa—solves the common grade problems at crossings, underpasses and in yards... And used with the Matisa Tamper, produces roadbed that is *better than new-laid track* put down with other ballasting methods.

Matisa Ballast Cleaners are furnished on a supervised rental basis for cleaning 1,000 feet or 1,000 miles of your track . . . rapidly, efficiently and *completely.* Write our M. W. Engineering Department for details on 1951 Cleaner availability.

THE MATISA EQUIPMENT CORP.
224 South Michigan Blvd. • Chicago 4, Illinois

ALL OVER THE WORLD ***Matisa*** TRACKWORK SPECIALISTS

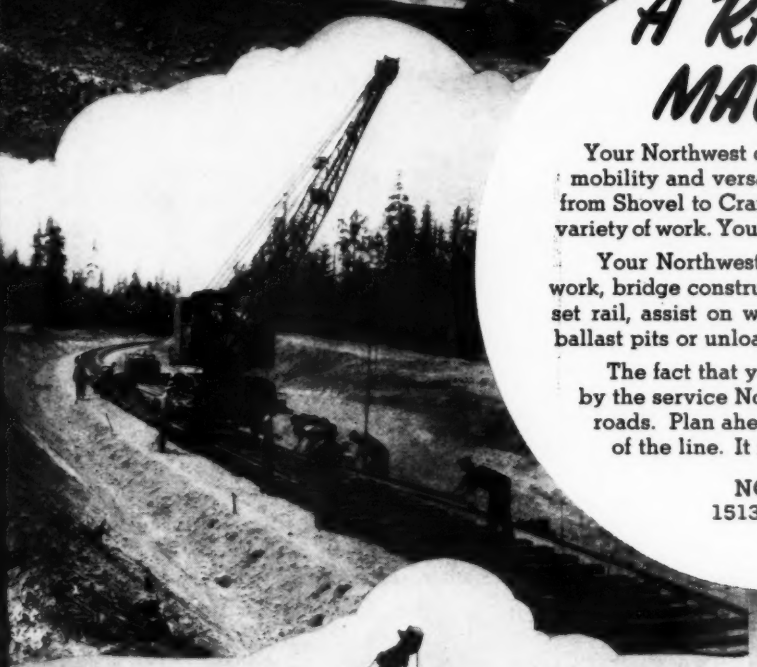
A RAILROAD MAN'S MACHINE

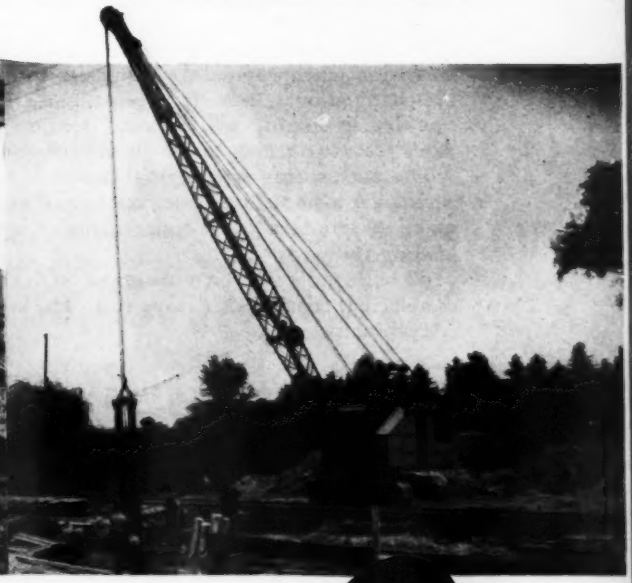
Your Northwest does things no track type machine can do. Its mobility and versatility made possible by its easy convertibility from Shovel to Crane or Dragline, permits scheduling it on a wide variety of work. You'll complete jobs you couldn't get finished before.

Your Northwest will handle bank trimming, ditching, magnet work, bridge construction, pile driving and storeyard work. It will set rail, assist on wrecking work, dig lead-off ditch, work in the ballast pits or unload and load material.

The fact that your Northwest is a railroad man's rig is proved by the service Northwests are giving many leading Class I Railroads. Plan ahead now to have a Northwest on every section of the line. It means better operation at lower cost.

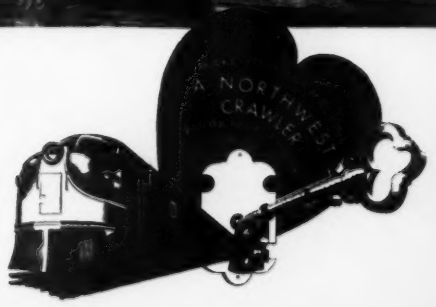
NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

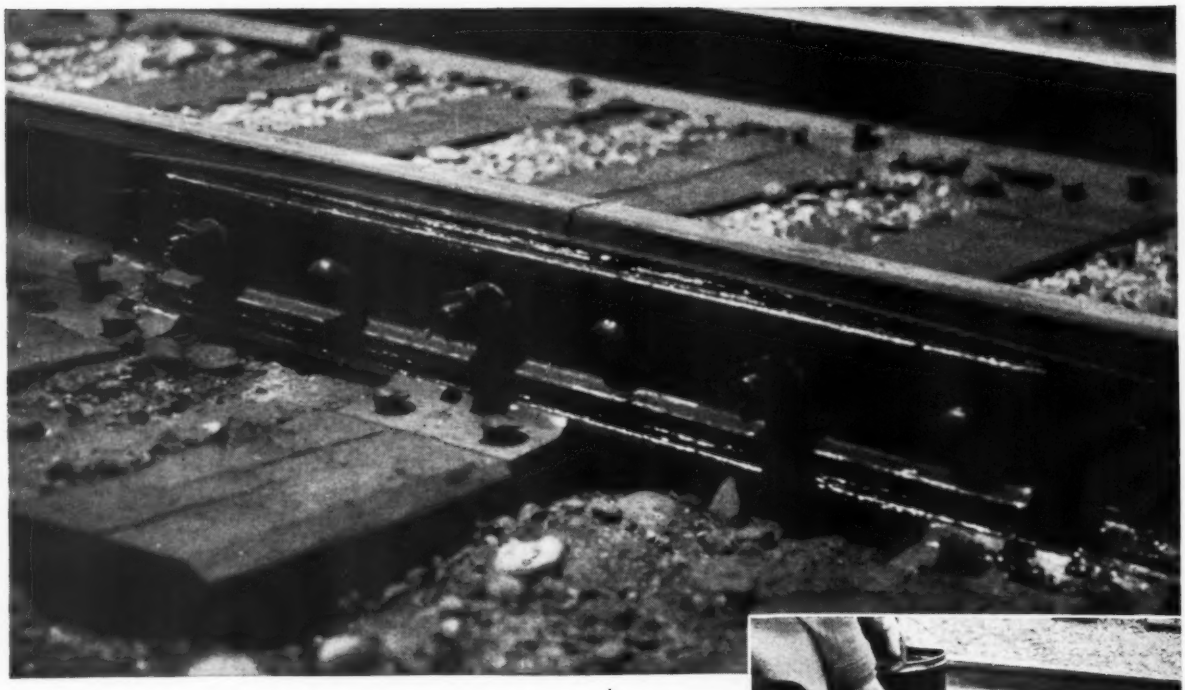




NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL





how to protect rail joints with NO-OX-ID

NO-OX-ID "A Special" gives long-term protection against corrosion when applied on new rails and where joint bars are changed out. Properly applied, NO-OX-ID "A Special" non-drying coating will prevent freezing of the rail joint. Adds years to normal service life at a lower maintenance cost.

The outstanding weathering qualities of NO-OX-ID, its resistance to moisture penetration, and ease of application make it "standard" with maintenance of way men on many leading railroads.

We will gladly tell you more about NO-OX-ID "A Special," the efficient coating that stops rust. The coupon is for your convenience.

DEARBORN CHEMICAL COMPANY
Merchandise Mart Plaza • Chicago 54, Illinois

Easy, Inexpensive to Apply

1. Using a wooden-backed wire brush in each hand, workman removes loose scale on both sides of the rail in one operation.
2. A sufficient quantity of NO-OX-ID is placed on each side of rail, using a dipper or ladle.
3. The NO-OX-ID is then brushed on the rail ends with a two-knot roofing brush.

This application method assures good bond of NO-OX-ID on the rail.

Write for complete instructions on how to apply NO-OX-ID "A Special"

Dearborn Chemical Company
Merchandise Mart Plaza, Dept. RE
Chicago 54, Illinois

Please send me bulletin on "How to Protect Rail Joints Using NO-OX-ID."

Name.....

Company.....

Address.....

City.....*Zone*....*State*.....

Dearborn
Reg. U. S. Pat. Off.

NO-OX-ID
IRON + OX = RUST

THE ORIGINAL RUST PREVENTIVE

Cut roofing maintenance costs with Johns-Manville asbestos roofs

J-M Asbestos Roofing Shingles

Here's the Johns-Manville Asbestos Shingle roof that was installed on the Taylorville, Ill., station of the Wabash back in 1926 . . . and is still on the job after a quarter century of service.

Johns-Manville Asbestos Shingles are fireproof, weatherproof, and rotproof—not one has ever been known to burn or wear out. They come in a variety of colors, and make a roof that will harmonize with any type of architecture.

J-M Asbestos Built-Up Roofing

This Johns-Manville Asbestos Built-Up roof on the Illinois Central Stuyvesant Docks in New Orleans—installed over 35 years ago—is still giving dependable service.

Johns-Manville Asbestos Built-Up Roofs are smooth surfaced providing thorough drainage . . . and assure a long service life for minimum initial expense. Made of asbestos, each ply is a flexible covering of stone that won't dry out, and the finished roof requires no periodic protective coating.

These roofs are typical of the many J-M asbestos roofs that are in service year in and year out . . . with little or no maintenance. Under constant attack from wind, rain, sun, snow and sleet . . . these roofs have set money-saving performance records because they are weatherproof, fireproof, and rotproof.

For your next roofing job, be sure to specify Johns-Manville asbestos roofing materials. You can get further details on these durable, long-lasting materials by writing to Johns-Manville, Box 290, New York 16, New York. In Canada, write Johns-Manville Co., Ltd., 199 Bay Street, Toronto 1, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

93 YEARS OF SERVICE TO TRANSPORTATION

STRENGTHENING — Arc welding a flange reinforcing plate to a floor-beam of a railroad bridge. Airco No. 78E or 387 electrodes are generally used for this type of work. Strengthening operations like this prolong the life of a bridge far beyond normal expectancy.

"SHRINK" FITTING — Standard Airco oxyacetylene flame heating equipment is used to take the slack out of eye-bar tension members. Eye-bars as heavy as 10" x 2" can be shrunk without any apparent effect on fatigue strength or static strength.

"Beef up" A BRIDGE — AIRCO HELPS

Today's diesel-powered fast-moving trains, plus stepped-up traffic requirements, call for "beefing up" bridges and other right-of-way structures to the point where these heavier loads may be carried with "top" safety and less maintenance.

For this reason many leading railroads are turning to versatile Airco oxyacetylene and arc welding processes. These time-tested, proved techniques are used to strengthen and reinforce bridge structures by welding plates, angles and other shapes to floor-beams, stringers, chords, and similar bridge members. All reinforcement materials can be easily and inexpensively cut to size with Airco oxyacetylene gas cutting equipment.

If you have a problem that calls for "beefing up" right-of-way structures to handle today's high-powered equipment, and stepped-up traffic, one of Airco's Railroad technical men will be glad to work with you — help you develop better methods of maintaining this highly important equipment. Get in touch with your local Airco office today for complete information.

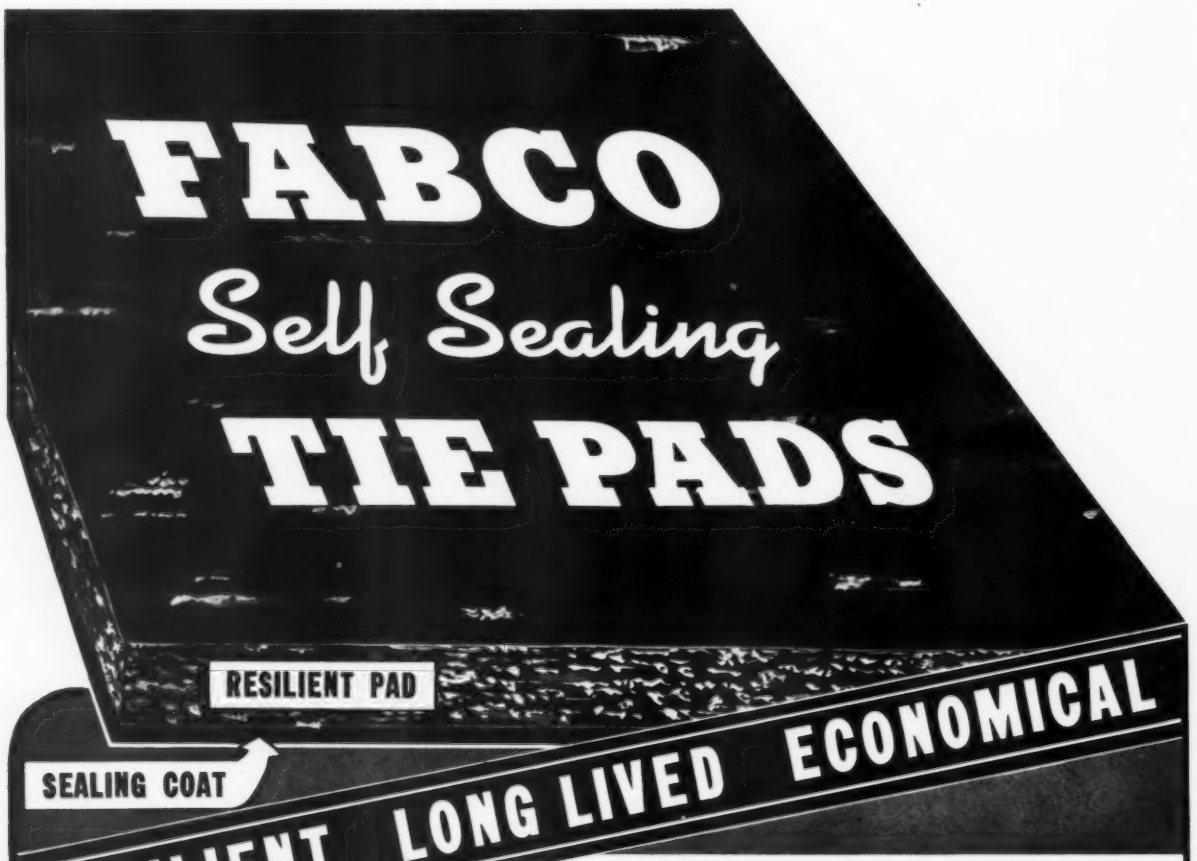
FLAME CLEANING — Proper painting is vital to the life of a bridge. Here, Airco's Style 800 torch with Style 110 round tip loosens old paint, scale and rust, and drives off moisture. Flame cleaning is inexpensive and fast—often it's the only satisfactory way to prepare lattice-like structures for painting.

Costs Come Down Under the Airco Plan

AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY, INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities



They Seal Out Moisture and Dirt and Prevent Mechanical Wear of Ties

OVER THE YEARS Fabco Tie Pads of resilient rubber and cotton fibre have demonstrated their ability to prevent mechanical wear of ties through elimination of plate cutting and to give long service as well.

THE SAME Fabco Tie Pad is now available with a thoroughly proven self-sealing coat on one side to bond pads to ties, thereby keeping out moisture and dirt . . . Applied to Fabco tie pads before shipment, it consists of a 1/16" coat of sealing compound on the side of the pad next to the tie. Since the tie plates tend to move under traffic, it is not advisable to bond the pad to the plate, but leave the plate free to move, — greatly reducing any tendency to break the seal between the bottom of the pad and the tie . . . Same standard and special sizes as unsealed Fabco Tie Pads, but 5/16" thick instead of 1/4".

Sealing agent only on side next to tie permits limited tie plate movement without disturbance to the bond of the tie.

Sealing agent positively adhered to pad without altering structure or characteristics of the pad.

Sealing agent compounded to withstand extremes of weather.

FABCO *Self Sealing* TIE PADS are as easy to install as regular FABCO TIE PADS.

***Use* Fabco Tie Pads . . . Sealed or Unsealed . . .**

***For* Maximum Protection Against Mechanical Wear**

FABREEKA PRODUCTS COMPANY, INC. 222-M SUMMER ST. BOSTON 10, MASS.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

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READER SERVICE DEPT.

RAILWAY ENGINEERING AND MAINTENANCE August, 1951

Please send me additional product information as requested below.

☐ Literature Only ☐ Desire to see Representative ☐ Price Data

Product and Page No. ________

Name ________

Title or Position ________

Company ________

Address ________ City ________ Zone ________ State ________

Please Fill Out Card in Full

Making Tracks WITH LORAINS

ON THE E. J. & E.

On the Elgin, Joliet & Eastern Railroad, here is a lesson in low-cost maintenance. Track maintenance is geared to the high-speed mobility of their rubber-tire Lorain-TL Moto-Crane that "makes tracks" all along the right-of-way, cutting travel time between jobs, as well as meeting emergency schedules. For other track maintenance duties, Lorain crawler cranes serve many roads similar to the one below. Here, a larger Lorain-50 crane lays rail for a turn-out so that mainline repairs may be made.

If you want to "make tracks" on maintenance or construction work, there is a Lorain size and type to exactly fit your needs. Consult your Thew-Lorain distributor for specifications and recommendations.

THE THEW SHOVEL CO., LORAIN, OHIO

The Lorain line offers the world's most complete selection of sizes, types and mountings for railroad maintenance and construction. Here's *selection unlimited* — to fit your road with the right combination for top efficiency:

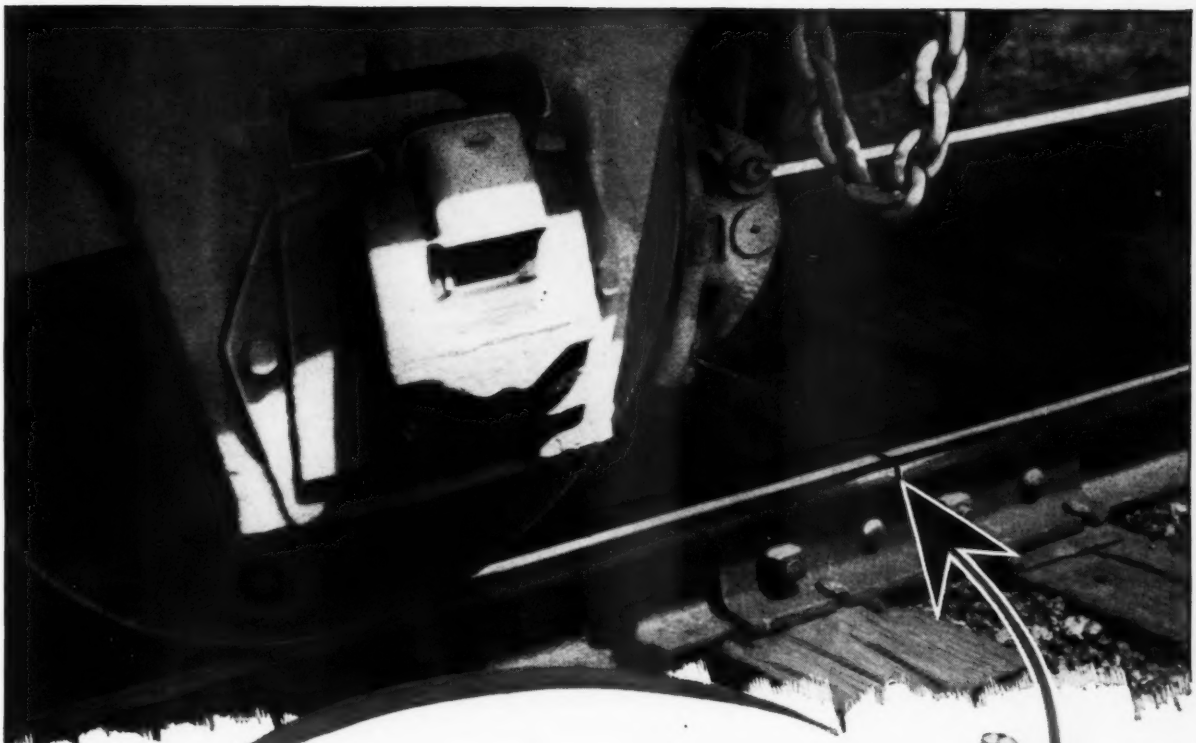
- 6 MACHINE "SERIES"— from 1/2 to 2-yard shovel classes — 6 to 45-ton crane lifting capacities.
- 3 MOUNTING TYPES — crawler, single-engine Self-Propelled or 2-engine Moto-Cranes on rubber-tires.
- 5 FRONT ENDS — shovel, dragline, clamshell, hoe, crane (and pile driver) — all interchangeable.

Here's the E. J. & E. Lorain-TL Moto-Crane, 2-engine, rubber-tire mounting, 33 m.p.h. travel speeds, available with 2 or 3 axles, 4 or 6 driving wheels, 10 and 15-ton capacities; also 20, 25-ton models.

This Lorain-50 crawler crane (in the 1-yd. class) handles track laying duties along the right-of-way to speed maintenance work for another large railroad.

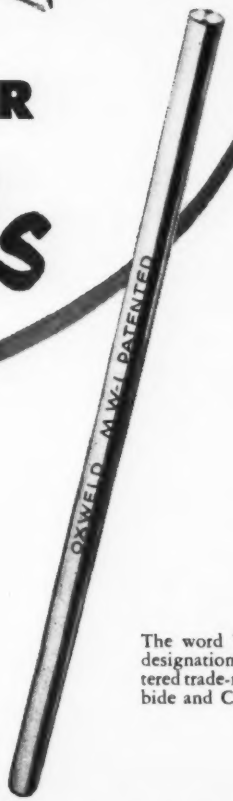
THEW LORAIN®

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS
ON CRAWLERS OR RUBBER TIRES



NEW LIFE FOR

Battered Rails



Rail-ends rebuilt with OXWELD MW rod last 50 to 100 per cent longer in first position. This specially developed rod provides hardness, abrasion resistance, and high tensile strength . . . more batter-resistance than the original rail. Ask OXWELD for more information.

The word "Oxweld" and the designation "MW" are registered trade-marks of Union Carbide and Carbon Corporation.

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canad an Railroad Service Company, Limited, Toronto

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

tough floors for tough conditions

BLUE TEMPER

FEREM FLOORS

In your plant you can have dense, ductile floors almost diamond hard, which are not slippery, showing no noticeable wear for long periods and involving practically no upkeep costs. Such floors are constructed with Ferem, the "Blue Temper" component in the floor topping, replacing sand, stone and silica.

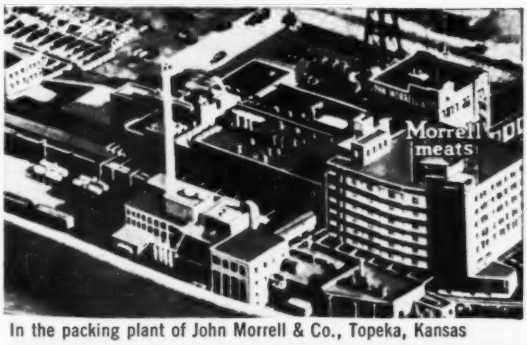
Ferem is used in heavy duty floors, loading platforms, corridors and runways in newly constructed buildings, or when replacing worn or eroded floors. Ferem is resistant to the corrosive action of chemical solutions—and highly slip-proof under the wet floor conditions of many industries.

USED IN

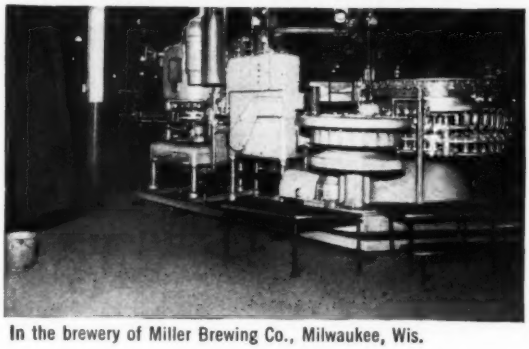
- Breweries and Beverage Plants
- Distilleries
- Dairies
- Packing Houses
- Canning Plants
- Chemical Plants
- Industrial Plants

In the Sucrest refinery of American Molasses Co., Brooklyn, N. Y.

In the kitchens of Thrifty Drug Chain, Los Angeles, Cal.



In the packing plant of John Morrell & Co., Topeka, Kansas



In the brewery of Miller Brewing Co., Milwaukee, Wis.

horn

A. C. HORN COMPANY, INC.

MANUFACTURERS OF MATERIALS FOR BUILDING MAINTENANCE AND CONSTRUCTION

10TH STREET & 44TH AVENUE, LONG ISLAND CITY 1, N. Y.

LOS ANGELES • SAN FRANCISCO • HOUSTON • CHICAGO • TORONTO

SUBSIDIARY OF SUN CHEMICAL CORPORATION

HORN PRODUCT

RE-51

GENTLEMEN:

Please send complete data on FEREM FLOORS.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

BROWNHOIST

builds better diesel electric locomotive-cranes . . .
only BROWNHOIST gives you all these features

NEW HOIST CLUTCHES. Roller-bearing mounted wide-faced drums. Air-operated cylinder, mounted within the drum itself . . . provides high line pull and easy adjustment.

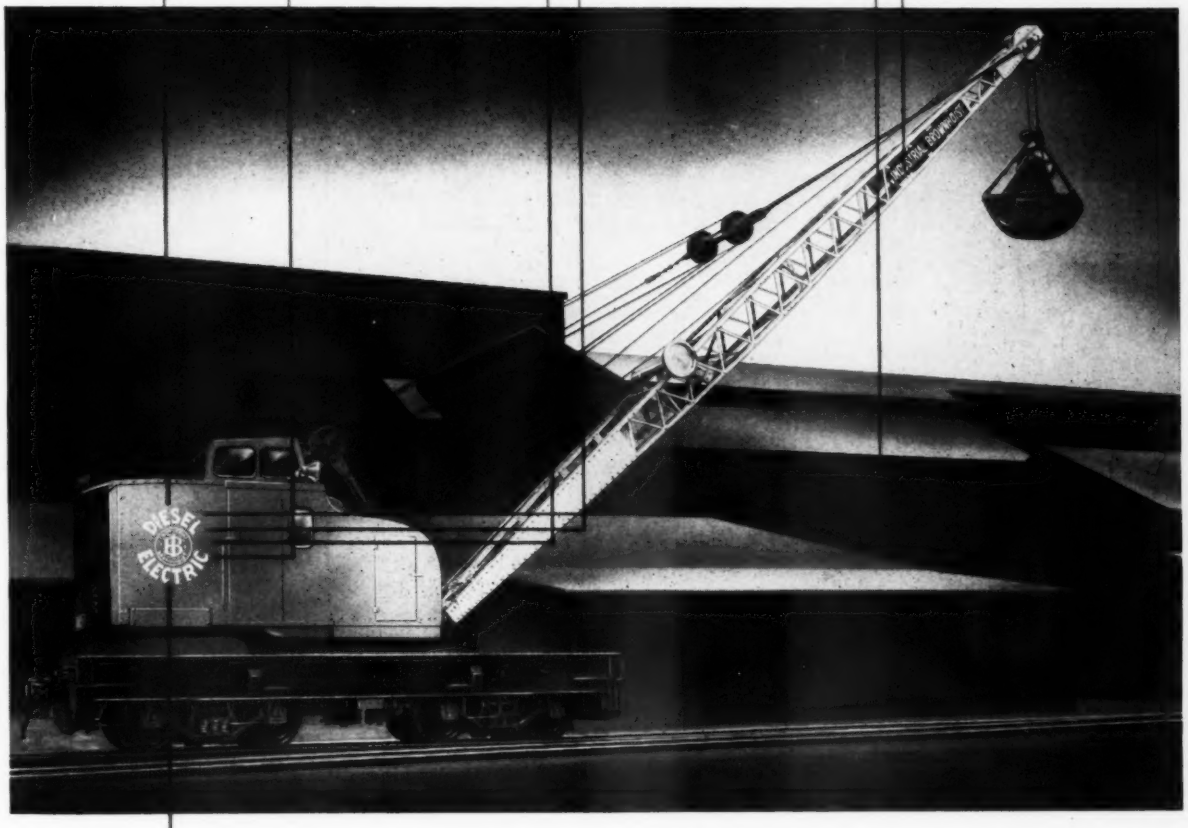
ELECTRIC ROTATION together with electric travel reduces maintenance to a minimum.

NEW FRICTION CLUTCH BOOM HOIST. Safe! Driven by worm and wheel enclosed in oil bath. Twin-barrelled, extra large diameter boom-hoist drums in full view of operator. Drums take all line in one layer which eliminates overlapping and fraying of rope.

DYNAMATIC CLUTCH between engine and crane machinery now standard equipment. Gives smooth, sensitive, 32 step control. Banishes slippage. Eliminates torsional impulse and vibration.

NEWLY DESIGNED, EXTRA HEAVY STREAMLINED CAB with controls functionally located for operating efficiency. All machinery guarded against weather, yet readily accessible.

NEW CLEAR-VISION BOOM provides maximum vision for greater working efficiency. This open type boom in conjunction with the Brownhoist patented Monitor-type cab guarantees 360° visibility.



BROWNHOIST

and these optional features—8 wheel chain drive for increased drawbar pull. Twin engine drive for work on extreme grades or where greater tractive effort is required. Timken roller bearing journals for low starting tractive effort. For complete description write to . . .

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INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, San Francisco, Chicago, Canadian Brownhoist Ltd., Montreal, Quebec. AGENCIES: Detroit, Birmingham, Houston, Los Angeles.

Completely mobile and
PERFECT
for 8-tamper gangs

Schramm's *Pneumatractor* tractor-compressor

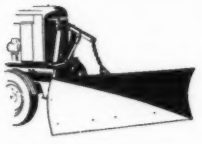
EXAMINE the power plant of this new *Pneumatractor*, 105-foot actual air compressor. Notice that instead of separate units it has Schramm's exclusive *Pneumapower* engine-compressor. This means simplicity, light weight and interchangeability—90 per cent of the engine parts also fit the compressor units.

The *Pneumatractor* also has the *Pneumastat* control, assuring infinitely variable speed and elimination of continuous loading and unloading. The *Pneumastat* cuts your fuel costs as much as 50 per cent!

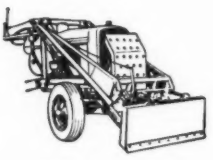
Other *Pneumatractor* features include electric starting, speed control, dual fan belts, tilting front axle, brakes, panel board, etc. All in all, it's the ablest, most efficient, and most useful maintenance compressor you could imagine, for with attachments, it is adaptable to many air and non-air uses that give you greater utility.

Learn more about the *Pneumatractor*. Write Schramm's Railway Sales Department for Bulletin NEU 50-B.

A few of the many extra uses* of this all-purpose machine



REVERSIBLE SNOW PLOW



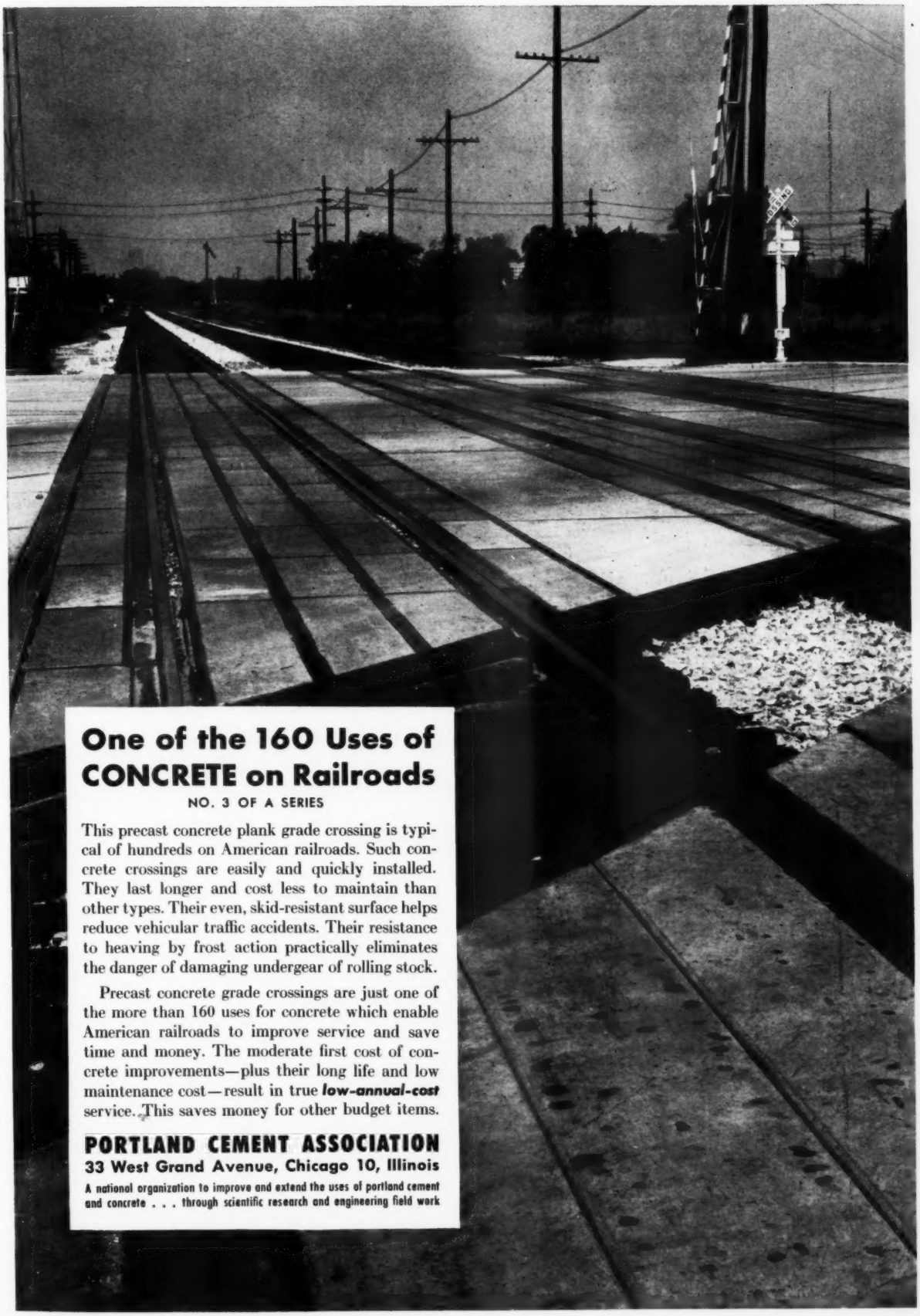
BACKFILL BLADE

FRONT-END LOADER

*with added equipment

SCHRAMM INC.

The Compressor People • West Chester • Pennsylvania



One of the 160 Uses of CONCRETE on Railroads

NO. 3 OF A SERIES

This precast concrete plank grade crossing is typical of hundreds on American railroads. Such concrete crossings are easily and quickly installed. They last longer and cost less to maintain than other types. Their even, skid-resistant surface helps reduce vehicular traffic accidents. Their resistance to heaving by frost action practically eliminates the danger of damaging undergear of rolling stock.

Precast concrete grade crossings are just one of the more than 160 uses for concrete which enable American railroads to improve service and save time and money. The moderate first cost of concrete improvements—plus their long life and low maintenance cost—result in true ***low-annual-cost*** service. This saves money for other budget items.

PORTLAND CEMENT ASSOCIATION

33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

YOU CAN'T BEAT THE NORDBERG BALLAST RECONDITIONING "THREESOME"

FOR SPEED ECONOMY AND VERSATILITY

1. CRIBEX

Removes material contained in the cribs and deposits it beyond the ends of the ties. Leaves a smooth, uniformly-graded tie floor, completely emptying the crib without damage to ties or rail. Proved in use in excavating over 3,500,000 cribs.

2. BALLASTEX

Excavates ballast in the area between the tracks or in the shoulder and disposes it by either wasting to the side or feeding it to the SCREENEX for cleaning. Digs a uniform trench 42-in. wide, or any desired depth to a maximum of 30-in. below top of rail.

3. SCREENEX

Takes fouled, excavated ballast from BALLASTEX, passes this material over a vibrating Symons Rod Deck Screen and returns cleaned ballast to the track, intertrack, or shoulder in any desired proportions—wasting the screenings to the side beyond the shoulder.

● With these three outstanding Nordberg machines, you have a combination that can solve virtually *any* ballast reconditioning problem. And what's more . . . this versatile "threesome" will accomplish the job *faster* and at *less* cost.

The speed, economy and versatility of the CRIBEX . . . BALLASTEX . . . SCREENEX trio has been amply proved in service in every kind of ballast. Let us show you how these modern ballast reconditioning machines can save time and money for *you*.

For full details, send for a copy of BULLETIN 174.

8751

Look to NORDBERG

. . . for continually improved TRACK MAINTENANCE MACHINERY
to do a Better, Faster Maintenance Job at Lower Cost

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

Here's how rubber-tired TOURNADOZER can speed rail maintenance

STRIPS JUNGLE UNDERGROWTH . . . Near Chandi, India, the Great Indian Peninsular Railway cut a mile-long siding through dense tropical jungle. One Tournadozer easily tossed aside tangled undergrowth, removed trees, stripped topsoil . . . than handled preliminary rough grading in rock and hard clay . . . and helped finish 23,000-yd. job well ahead of schedule.

You get action-fast

This powerful 186 h.p. dozer works anywhere . . . any time, "runs" on big 21.00 x 25 low-pressure tires at speeds up to 19 m.p.h. Tournadozer can be dispatched anywhere along right-of-way . . . in any kind of weather . . . through mud, sand or other conditions which would stall ordinary crawlers. To meet emergencies, operator can drive rig direct . . . over highway, cross country, over or alongside tracks to distant pushing, pulling or dozing assignments. A mile is only a few minutes away. No delays for work trains, blocking, loading or unloading.

With versatility of its standard bulldozer blade, interchangeable Angledozer blade or V-type Snow Plow, plus its ability to pull a Rooter or haul Scrapers, Tournadozer's an all-year maintenance tool. It has fast 4-wheel drive on rubber, instant gear change with constant-mesh transmission, torque converter, powerful 4-wheel, disc-type air brakes with a total of 2822 sq. in. braking area, plus fast, sure fingertip electric control.

Check actual job performance reports shown here. Ask your LeTourneau Distributor for additional output figures and other facts on versatile Tournadozer.

R. G. LeTourneau, Inc., Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

CLEARS LANDSLIDES

When a heavy landslide completely blocked a main Colombian highway, 62 miles south of Bogota, a Tournadozer drove 103 miles to the job, cleared the entire 4,000 cu. yd. slide of wet earth and rock, all in only 20½ hrs. Big rig can travel along tracks or highway to get to slide areas fast . . . goes anywhere along main or feeder lines . . . gives lift to short-handed section crews.

PULLS HEAVY EQUIPMENT

Skidding heavy compressor is one of many maintenance jobs Tournadozer handled around Interstate Iron Co. mines near Calumet, Minn. The "C's" big diesel engine and 4-wheel drive develop plenty of drawbar pull to handle heavy loads: pulls Carryall-Scrapers, tows Sheepsfoot Rollers, Rooters, blade graders, flat-bed trailers, heavy trucks; skids light generator plants, cable boats, poles, piling, etc.

STOCKPILES COAL

Public Service Electric & Gas Co., Camden, N. J., 208 tons of coal hourly from conveyor to sto with this C Tournadozer—E16 Carryall team. typical 760′ cycles, "C" delivers 16 tons ever min. Coal is compacted and sealed by rig's l wide, 2′ thick low-pressure tires to reduce poss of spontaneous combustion. Rig can also load, and spread cinders.

DOZES RAILROAD GRADE

Relocating Estrada de Ferro Sorocabana rail line between Tatui and Itapenitinga, in the State of Sao Paulo, Brazil, required preliminary grading along 18½ miles of right-of-way. Rubber-tired Tournadozer owned by Brazilian contractors, Morais e Ferreira e Ferreira, Ltda., traveled at high speed from job-to-job, cut down steep banks, cleared trees and brush, leveled dump areas, etc. Big 11′2″ x 43″ blade carries 2½ cu. yds. each trip.

FEEDS ROCK CRUSHER

C Tournadozer has been assigned the job of feeding portable rock crusher on highway resurfacing job being done by New Mexico State Hwy. Dept. near Albuquerque. Big 2½-cu. yd. blade digs up and delivers all the bed rock and gravel the crusher can handle. Because of its travel-anywhere ability, Tournadozer is ideal for servicing multiple ballast borrow pits spotted along right-of-way.

FILLS RAILROAD GRADE

Regrading Chicago Great Western Railroad righ way near Kenyon, Minnesota, Carl Bolander & Co., of Minneapolis put dirtmoving on a high-s basis with 2 C Tournapulls and 1 C Tournad When not in use for pusher loading, Tournadozer around culverts, driving over tracks wherever ne sary. Big rig also does drainage work, cuts down banks, clears trees, levels dumps, etc.

PUSH-LOADS SCRAPERS

Tournadozer, used as a pusher at site of new rail line construction for the Pemex Refinery in Mexico D. F. suburb, helped 2 C Tournapulls get 13 cu. yds. each load in ave. 45 sec., or a total of 312 cu. yds. per hour, on the 1,970′ cycle. Tournadozer also kept busy on preliminary clearing, rough grading. Rig also cuts down banks . . . fills washouts . . . reinforces causeways, or bridge approaches.

SPOTS RAILROAD CARS

Here, versatile Tournadozer spots empty rail cars under ore loader for Mesabi Iron Range Mining Company. Powerful rig is handy for switching cars . . . keeps sidings clear for incoming freight. Tournadozer takes shortest route between jobs . . . rubber tires permit it to cross or follow tracks anywhere without planking. Instant-shift gear selection keeps unit pushing without losing momentum.

PLOWS SNOW

In 34° below zero weather, a Rural Municipality Manitoba cleared over 600 miles of roads and f lanes in 142 hours. Drifts were 3 to 8 ft., some most solid ice. Tournadozer mounted a LeTourn 12′3″ x 6′6″ V-type snow plow. Vertical divider p eliminates plowing snow back on access roads, ings, loading tracks. Big tires and adjustable ru shoe protect plowed surface.

Send now to: **R. G. LeTOURNEAU, INC., Peoria, Ill.** Tell us more about Tournadozer with:

Name..... Title.....

Company.....

Street.....

City..... State.....

- ☐ Bulldozer
- ☐ Snow Plow
- ☐ Tree Pusher
- ☐ Logging Dozer and Winch
- ☐ Rooters
- ☐ Rollers
- ☐ Carryalls
- ☐ Snow Wing
- ☐ Angledozer
- ☐ Root Rake
- ☐ Side Crane

LETOURNEAU LET

Best Start for foundation cost savings!

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Monotubes' tapered design and cold-rolled properties not only *save steel,* but also provide unusually high bearing values and exceptional lateral stability. So it's not uncommon to meet load-bearing requirements with less driving . . . or even *fewer* piles. And, because Monotubes are readily extendible on the job, with easy cut-off and simplified weld-splicing, further materials conservation is afforded.

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Send for all the interesting facts about Monotubes. Find out how their many advantages can help you save right at the start of your construction projects. For complete data, write The Union Metal Manufacturing Company, Canton 5, O.

UNION METAL

Monotube Foundation Piles

For additional information, use postcard, pages 675-676

The gang's all here—on TIMKEN® bearings

RAILWAY maintenance gangs get where they're going faster with this Bridge and Building Gang Car manufactured by the Northwestern Motor Company. Delays due to car lubrication or repair are minimized because it is equipped with Timken® tapered roller bearings—on all axles, on gear box pinion shaft, and on differential front axle.

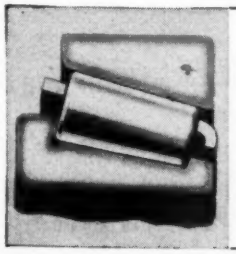
Timken bearings hold shafts in proper alignment, keep gears meshing smoothly and accurately. There's less wear on moving parts. Because tighter closures are permitted, lubricants are kept in—dirt and grit kept out.

The tapered construction of Timken bearings enables them to take any combination of radial and thrust loads. There's extra load-carrying capacity in Timken bearings because of line contact between rollers and races. Timken bearings are engineered for the job, precision manufactured, and made of Timken fine alloy steel. That's why they normally last the life of the machine.

For over half a century the outstanding performance of Timken bearings has made them first choice throughout industry. Make sure you specify them in the equipment you buy and use them in the machines you build. Always look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company. Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

NORTHWESTERN MOTOR COMPANY reduces maintenance, lengthens life of 566 F gang car by mounting axles, gear box pinion shaft, and differential front axle on Timken roller bearings.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

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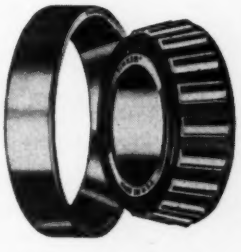
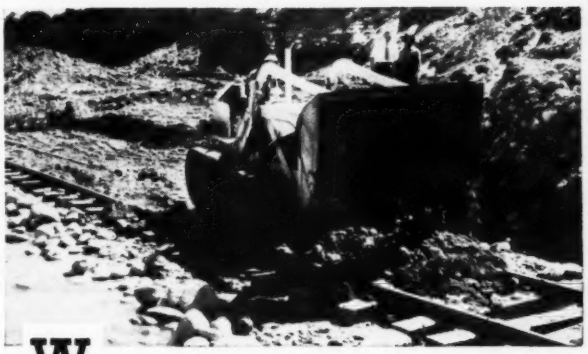
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION →◎←

NEW SPURS FOR OLD



With a heavy flood washing out the 12-mile spur that runs to the Pine Flat Dam on the Kings River near Fresno, California, the Pine Flat Contractors make short work of rebuilding the spur as their HT4 TRAXCAVATOR takes over the task of excavating, carrying and spreading ballast. With sure digging power, the HT4 quickly excavates heaping loads of stone-filled ballast material. Then, traveling along the newly laid track, the HT4 dumps and spreads its load to accurate grade.

This same digging, loading, grading and spreading ability adapts the Trackson TRAXCAVATOR to a wide variety of off-track and ontrack construction and maintenance work. Daylighting cuts, shoulder maintenance, cleaning ditches, snow removal . . . all taken in stride . . . as the TRAXCAVATOR is transported easily from section to section.

Designed to efficiently use the power and capacity of their matching "Caterpillar" Diesel Tractor teammates, TRAXCAVATORS are available in five sizes ranging from 1/2 to 4 cubic yards in capacity. Call your TRACKSON—"Caterpillar" Dealer for full information on these time and manpower saving units. Or write TRACKSON COMPANY, Dept. RE-81, Milwaukee 1, Wisconsin.

TRACKSON
TRACTOR EQUIPMENT

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

Their dependability has been proven by years of actual service on hundreds of railroads.

BEALL HI-DUTY SPRING WASHERS, being made especially for railroad service are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

BEALL TOOL DIVISION (HUBBARD & CO.)
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SPECIALIST MANUFACTURERS OF SPRING WASHERS

made especially for Railroad Service

BEALL Hi-DUTY SPRING WASHERS

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Dow research supplies the answer to *your* problems of vegetation control in ballasts, along right-of-ways and under bridges and culverts. Tests over a period of many years in cooperation with leading railroads and service organizations have enabled Dow to produce a complete line of proved chemicals to combat nearly every type of troublesome vegetation on the average right-of-way. Today, the use of Dow brush, weed and grass control products is cutting costs from 25% to as high as 50% over laborious hand-cutting methods.

Dow sales and technical men are eager to cooperate with *you* on your vegetation control problems. Your inquiry addressed to The Dow Chemical Company, Midland, Michigan will receive prompt attention.

ESTERON BRUSH KILLER containing equal amounts of low volatility esters of 2,4-D and 2,4,5-T controls woody plants including alder, birch, brambles, cherry, elm, hickory, oaks, osage orange, poison ivy, sumac, willow, and many other species. Assures satisfactory control of most troublesome species on the average right-of-way. Also effective in treating stubs and stumps to control resprouting.

ESTERON 245 controls woody plants in the same manner as Esteron Brush Killer. It is particularly effective on 2,4-D resistant species such as brambles, hawthorn, mesquite, osage orange and poison ivy. Also very effective for stump treatment and dormant basal bark application.

2-4 DOW WEED KILLER, FORMULA 40 is effective against herbaceous weeds. Can be used with Sodium TCA 90% to obtain control of both weeds and grass at one spraying.

SODIUM TCA 90% controls Johnson, quack and Bermuda and other grasses. At lower dosages, it retards growth without killing, where a light grass cover is desired.

Agricultural Chemical Division

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GRAIN AND SOIL FUMIGANTS • WOOD PRESERVATIVE

No. 272 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION
79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: A Big Job—But Satisfying

August 1, 1951

Dear Readers:

They say that it is beneficial for individuals, once in awhile, to take stock of their objectives in life and the means they are using to attain them. At such a moment a person asks himself what he hopes to achieve in business, in his family life, in the social sphere, and along other lines of endeavor, and then attempts frankly to determine if his present attitude and procedures are such that they are likely to bring him to the goals that he has set for himself. If he sees that he is wandering from the chosen path then it is apparent that he must change his ways if he is to be successful.

So it is with business enterprises—magazines like this one, for example. We, too, must occasionally pause to bring our objectives into focus to determine if any reorientation of policies or practices is necessary to assure that our aims will be realized. My intention in this letter is to do some "thinking out loud" on this subject, with the thought that the results may be of interest to you as well as a reminder to us of our responsibilities.

Obviously, the primary objective of a magazine, like any private business venture, is to make a profit. The magnitude of the income of a magazine depends primarily on the amount of revenue realized from the sale of advertising space, although with "paid-circulation" magazines, such as Maintenance, some revenue is obtained from the sale of subscriptions. If a magazine in a particular field is to carry the maximum amount of advertising by companies interested in selling that field it must reach the largest possible percentage of those persons in the field who have an influence on purchases, and it must be read intensively by these persons. If the magazine is to have this recognition in the field served, it must have an editorial content of such a caliber that the required number of persons will be willing—even eager—to pay hard-earned cash to have the privilege of receiving the periodical.

Looking at the problem from the viewpoint of an editor, what kind of an editorial section must be provided to assure the required readership? First, of course, we must know our readers and the kind of material that will catch and hold their interest. From long experience we know that your principal interest is in developments that may help you in your work, and that it is necessary for us to give you complete coverage of these developments in the form of readable, concisely-written, well-illustrated articles. That, in a nutshell, is the objective of the editorial staff of this magazine—an objective that must dominate our thinking and activities at all times.

If you will stop to think about it for a moment you will quickly realize that this is a large responsibility. It means that we must know what of significance in the maintenance of way and structures field is transpiring on all the railroads in North America—and, to a lesser extent, on other continents—that we must select those we feel will be of optimum interest and value to you, and that we must find ways and means of bringing you the essential facts regarding them. All this requires constant alertness, careful planning, much travel, and plenty of hard work. But on the other hand we experience a deep sense of satisfaction in the knowledge that our work is aimed at helping you to do a better job.

Yours sincerely,

Merwin H. Dick

MHD:ag

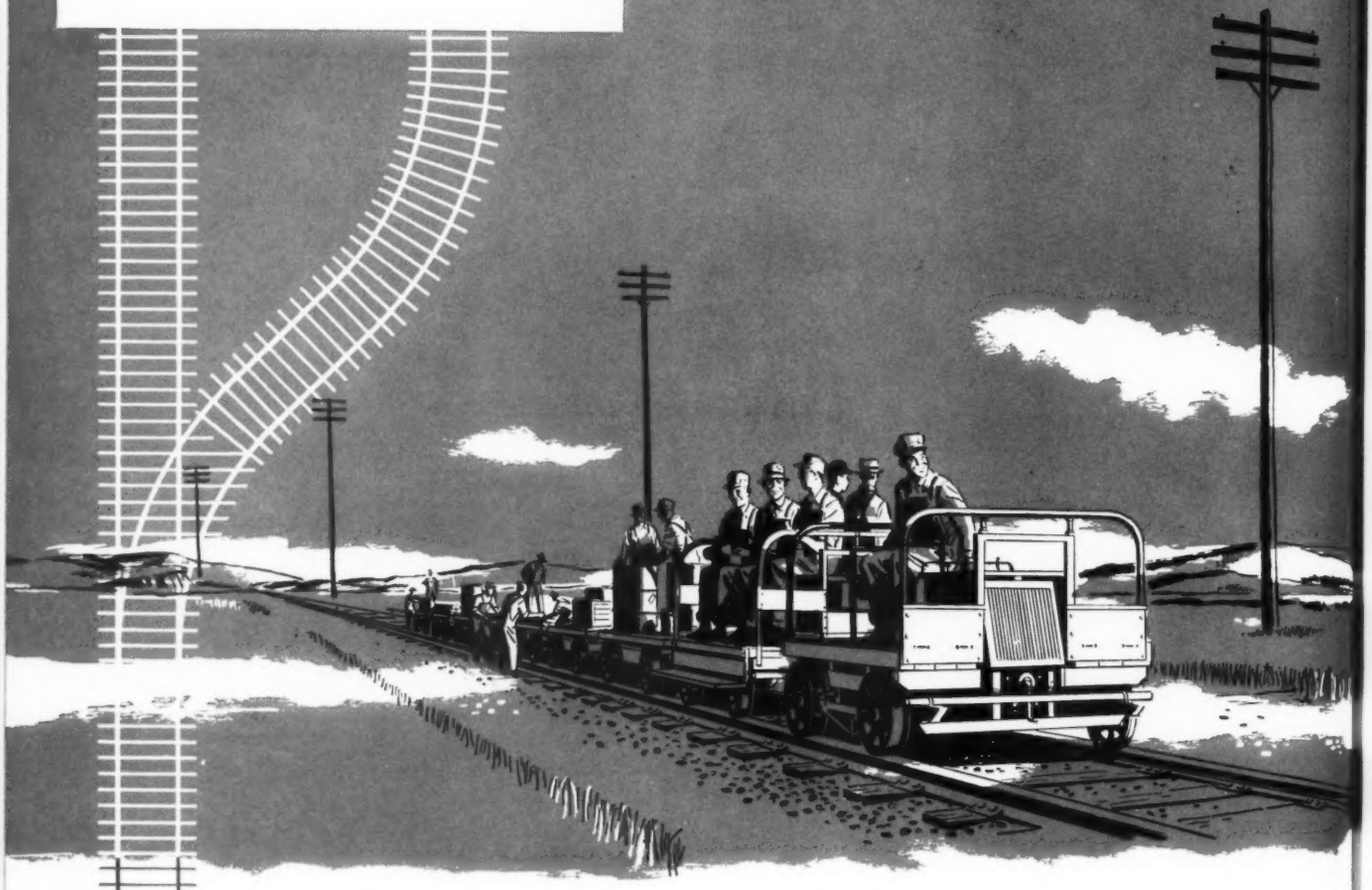
Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

Fairmont

RAILWAY MOTOR CARS
AND WORK EQUIPMENT

. . . specialists in the "long haul"!



Fairmont maintenance equipment is always the wise investment for the "long haul"—for it knows no rival for rugged construction, long life and economy. But here's a Fairmont achievement that's a specialist in the "long haul" in more ways than one—the A5 Series C Gang Car. Capable of pulling 6 trailers loaded with 120 men at 30 MPH on level track, this powerfully built workhorse is readily adaptable to almost any hauling requirements. Its many special features include a highly efficient 31.5 h.p. engine, a 4 speed transmission either forward or reverse, a needle bearing propeller shaft, enclosed gear drive and water cooling with a pump and thermostat. Yes, whatever your hauling needs, you'll find the A5 Series C Gang Car graphic proof that Fairmont builds to perform where performance counts—*on the job!*

Performance ON THE JOB COUNTS

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

Railway Engineering and Maintenance

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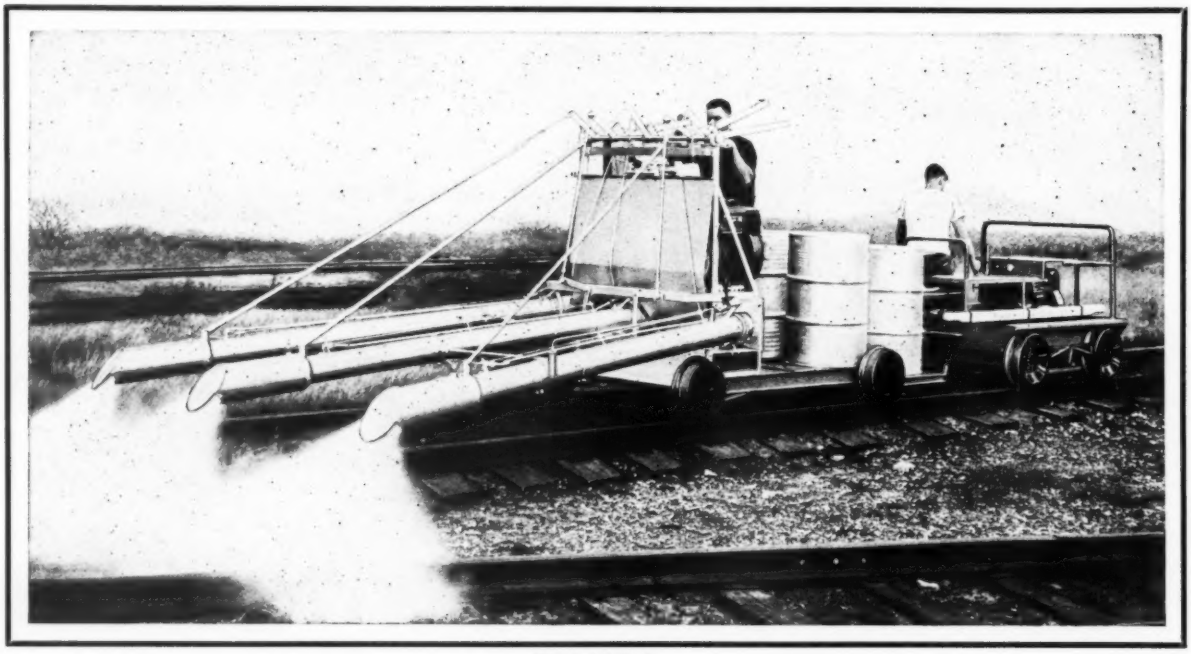
DESTROY WEEDS



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WOOLERY WEED BURNER trailer type (shown above) can be towed by motor car. Three burners clear a swath 15 feet wide on first trip and if required can be widened to 25 feet with burners extended on second trip.

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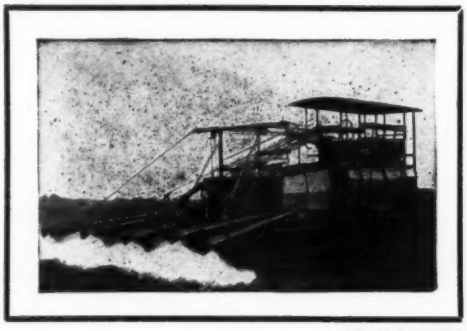
WOOLERY GIANT OCTOPUS is the favorite for heavy duty requirements. Will destroy a swath 25 feet wide in one trip or up to 35 feet with burner arms extended on second trip.

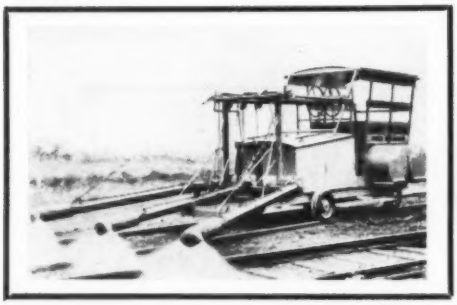
Model WBF
WOOLERY MIDGET OCTOPUS is recommended for normal requirements and has all the features of its bigger brother. Has three burners instead of five and will burn a swath 15 feet wide on first trip and 25 feet on the second.



Model WBZ

WRITE FOR COMPLETE INFORMATION

Model WBF



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For additional information, use postcard, pages 675-676

Open Minds —

Are Necessary When Visiting Other Roads

Railway maintenance men have probably always made it a practice occasionally to visit other railroads to inspect particular operations or projects. But in recent years there seems to have been a gratifying increase in this custom. Several factors have contributed to this tendency. One is the growing practice among the manufacturers of equipment, materials or devices to invite maintenance men from various lines to visit installations of their products on other roads. Another is the practice of A.R.E.A. committees to hold some of their meetings in connection with field inspection trips to get first-hand views of installations or operations pertinent to the subjects under study. A third is simply what appears to be growing curiosity among maintenance men to know what the other fellow is doing and how he is doing it.

This evidence that maintenance men are exposing themselves on an increasing scale to practices on other roads is a healthy sign. If these visits to foreign lines are viewed as a means of obtaining additional knowledge which may be put to use on the home property, then tangible benefits in the form of reduced costs or increased effectiveness are likely to accrue. In other words, if the practice of finding out first-hand what the other fellow is doing is generally followed and if superior practices thus brought to light are actually adopted there is no question but what the result will be an acceleration of progress in the maintenance field as a whole.

The important question is whether maintenance men as a group are holding their minds open to new and better ideas (that is, better than those in use on their own roads) when visiting other lines. Recent scattered incidents indicate that perhaps there could be an improvement in this direction. In one instance, in which a group of maintenance men was observing track gangs at work on a particular road, it was noted that, while a few of them examined the organization and equipment of the gangs with great care, some of them making written notes, the majority of the visitors paid only cursory attention to what was going on. In another, the chief engineer of a road that has an extremely efficient maintenance organization commented that he had heard rumors to the effect that at least some visitors from other lines had made adverse reports to their managements regarding what they had seen on his road.

It is not to be expected that visiting maintenance men will always find practices superior to those in effect on their own roads, but it is important that the visitors keep their minds open to new and better ideas so that they will recognize a superior practice when they see one. It is even more important that the superior practice be put into effect on the visitors' own territories; otherwise they might as well have stayed home. There is no excuse for rejecting meritorious ideas simply because they are not a product of one's own mind. It is said that the Chinese will go almost to any extreme to avoid "losing face." Maybe that is one reason why China is such a backward nation in so many respects.

METALLIZING—

Has Merits Worth Looking Into

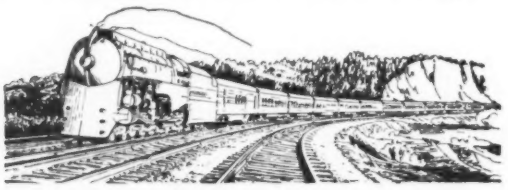
ZINC has long been known as being one of the best means of rustproofing iron and steel, and has found its greatest application in the building field where it has been successfully employed for galvanizing the steel sheets commonly used for siding and roofing. In the railroad industry galvanized metal has been used widely for siding, roofing, downspouts, gutters, flashings, and related fastenings.

Being a base metal of the non-ferrous type, zinc cannot rust, and it is because of this characteristic that it has been given a great deal of consideration as a protective coating for the ferrous metals that are prone to corrosion. A number of railroad bridge engineers have made attempts to protect some of their bridges from the severe corrosion resulting from brine drippings, by applying a metallic coating of zinc to the exterior surfaces, but have not always felt that satisfactory results were obtained. The poor results have been partly attributed to the occurrence of rust spots and partly to the fact that the expense of applying the metallic coating is greater than that of oil-pigment coatings.

In this issue is an article describing the successful protection of bridge spans from brine corrosion by one railroad that refused to accept a few unsuccessful applications of a metallic coating as conclusive evidence that such coatings are impractical. It found that the proper cleaning of the base metal is important, and also that a minute hole in the coating permits oxidation of the parent metal. Two coats are better and more economical than one; and three coats give even greater durability without increasing the cost of application in direct proportion.

About 1936, this road tested the use of galvanized track spikes on the field sides of the rails. After nine years of service, it found that standard carbon-steel cut spikes were 50 per cent corroded and that wrought-iron spikes were 70 per cent corroded, but that galvanized wrought-iron spikes were only 15 per cent corroded. The longer service life resulting from the protective coating was obtained at a cost of about 69 per cent more than the base price of the product. It is now the practice of this road to use galvanized spikes on the field sides of all rails and on both sides of rails in turnouts. In addition, all bridge-deck hardware now used on this road has galvanized coating.

A few other railroads have similar practices and, as the merits of metallic coatings become more widely investigated and made known, it is safe prognostication that metallic coatings will not only be adopted by more railroads for the protection of bridge steel, track spikes and bridge hardware, but also that the possibilities of adapting metallic protection to other vulnerable corrosive points will be studied seriously. At any rate, the application of metallic coatings as now developed is worth investigating on roads that have not yet given them serious consideration.



RAIL-END FAILURES—

Greater Use of Preventives Indicated

THE FAILURE of rails within the limits of the joint bars has developed into a major problem according to C. B. Bronson, maintenance of way assistant to vice-president, New York Central, in discussing this subject in the What's the Answer department of this issue. In fact he feels that there is nothing of "greater importance at the present time for concentrated study".

In making that statement Mr. Bronson is well aware, from his long service on the Rail committee of the A.R.E.A., of the progress already made, and still continuing, on this problem by that committee through its sponsored research. He realizes that such research has resulted in changes in the design of the A.R.E.A. rail sections, and in alterations in bolt-hole spacings, all of which should reduce the failures of rails within joint-bar limits. What worries him is the length of time it will take these better specifications to become effective through normal replacement programs.

On the other hand, the Rail committee research has developed another extremely important bit of information as to a major contributing cause of these rail-end failures, which offers considerable hope for ultimate solution of the problem. In his subcommittee report covering Recent Developments Affecting Rail Sections, which was presented at the 1950 convention, C. J. Code, engineer of tests (M. W.) of the Pennsylvania, reported that, where severe "corrosion is present, it becomes a practical impossibility to design the rail and rail joint so as to prevent fatigue failures . . . . whereas it does appear possible, by taking adequate measures to fight corrosion, to eliminate a very large percentage of such premature failures". (Vol. 51, pages 621-625, A.R.E.A. Proceedings)

Therein appears to lie both the aim of more research and the ultimate solution to the problem that now results in 40 per cent of the rail failures reported annually. Until research proves them inadequate or produces more effective corrosion preventives, there are presently available a number of coating materials, greases and lubricants that could surely reduce the incidence of corrosion-fatigue failures within the joint-bar areas, if their application were to become more widespread.

In the interim, as Mr. Bronson points out in his What's-the-Answer discussion, it is fortunate that testing devices are available for locating such hidden defects before rails ultimately fail.

Detail Programming Of Track Work Gets Results On D. L. & W.

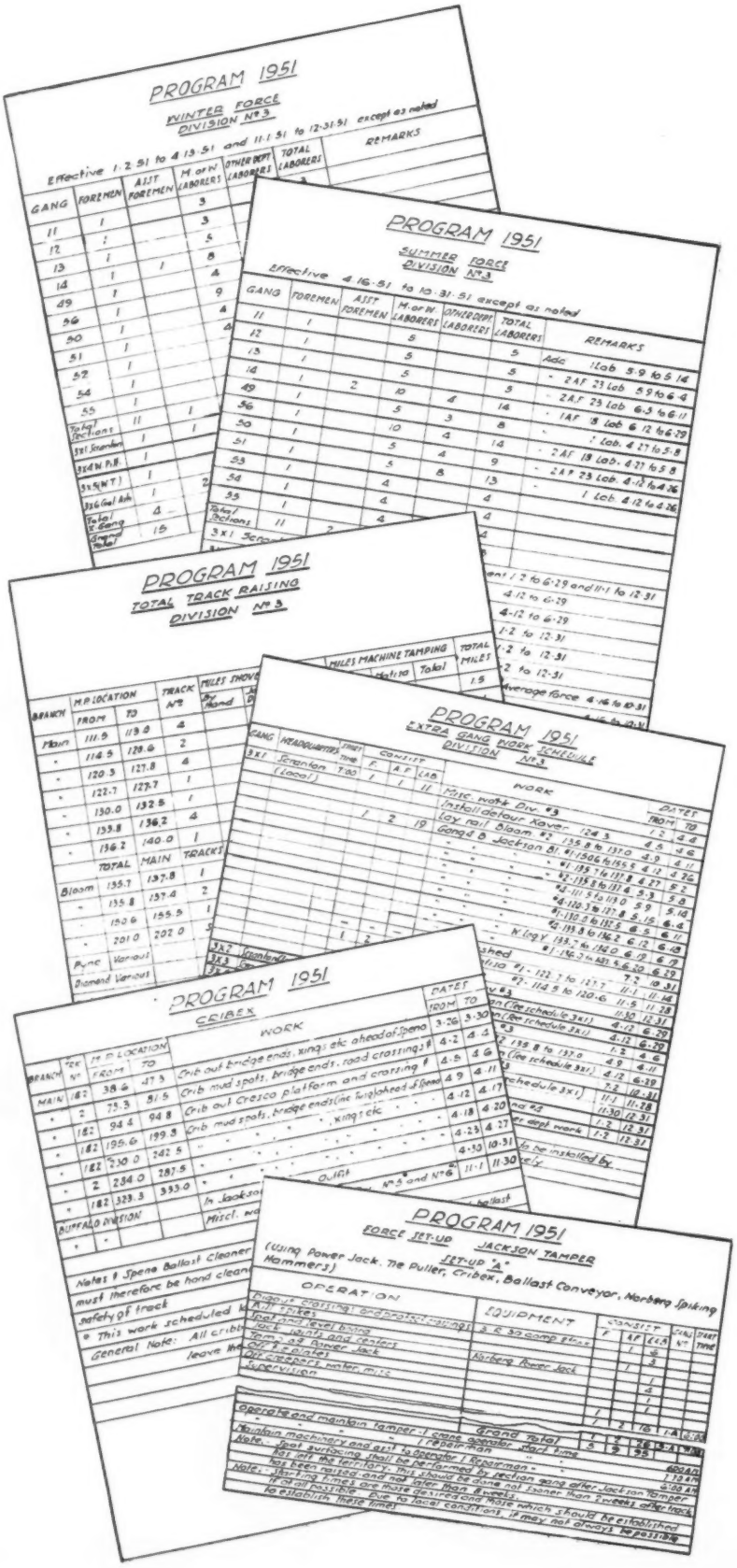
Heavy roadway maintenance work on the Delaware, Lackawanna & Western is carried out in accordance with a schedule, determined early in the year, which forecasts force allotments and amounts of the various kinds of work to be done during the year, and covers all essential details of the operation of machines and extra gangs.

• The programming of roadway maintenance work on an annual basis, in great detail and with a high degree of refinement, is a practice of several years' standing on the Delaware, Lackawanna & Western, and one which this company is convinced is producing substantial economies and other advantages. Based on the money allotment for maintenance-of-way work for a given year, as determined in January, the entire roadway maintenance program is worked out down to the last detail and incorporated in a book of letter-size blue-line prints, which becomes the "Bible" of everyone concerned, from the chief engineer down to the foremen.

The Lackawanna has been programming its roadway maintenance work on an annual basis for about ten years, but it was only about five years ago that it began use of the more detailed and precise methods now employed. The railroad feels that it is realizing a number of important advantages as a result of the careful and detailed manner in which its roadway maintenance work is programmed. It is convinced, for example, that when the amount of money that is to be spent over the entire year is definitely known, the work can be handled and regulated much more economically as compared with the practice of operating on a monthly basis, in which event considerable waste motion and loss of productive time may be involved in readjusting the activities of the maintenance forces every month.

Moreover, all those concerned with carrying out the yearly program have a definite goal to shoot at and know with a practical degree of certainty what they are going to be doing at any given time. The result is that a new **espirit de corps** has been introduced among the road's supervisory forces, which reaches in many cases down into the ranks. An important factor in creating and maintaining this spirit is the knowledge that nothing short of developments of major importance will cause any significant changes to be made in the program once it has been projected. For instance, last year 98 per cent of the programmed work was completed. In 1949 the percentage was 91; in 1948 it was 88; in 1947 it was 93, and in 1946 it was 82.

Another consideration behind



the Lackawanna's policy of programming its roadway maintenance work in great detail is the fact that this permits maximum utilization of the large amount of maintenance-of-way work equipment that is owned by the railroad. In fact, the use of work equipment is a major element in this company's effort to keep maintenance expenses at a minimum while maintaining a high standard of roadway maintenance. This is shown by the fact, that whereas the Lackawanna's investment in roadway machines, including highway trucks, as of December 31, 1941, was $581,176, this figure had increased to $1,294,212 at the end of 1950.

Machines Get Good Care

With such great dependence being placed on machines no effort is spared to minimize breakdowns of equipment on the job. To this end, every machine is sent to the railroad's central maintenance-of-way work-equipment repair shop at Scranton, Pa., for a complete overhauling every year. To make certain that machines will get the proper attention on the job a work-equipment repairman, provided with a specially designed and equipped highway truck, is assigned to each roadmaster's district. That this policy pays off in man-hours saved is shown by the fact that in 1950 the three Matisa tamping machines that the company owns were out of service due to mechanical trouble an average of only 14 hr. each. Similarly, the railroad's two Jackson Multiple Tampers were out of service for this reason only 5 hr. each.

Probably one of the best yardsticks for measuring the effectiveness of the Lackawanna's policies relative to the programming and mechanization of its maintenance work is this road's maintenance-of-way ratio. In 1945 the road's ratio of maintenance-of-way and structures expenditures (less charges to depreciation and retirements) to revenues was 10.41. In spite of the substantial increases in hourly wages of maintenance-of-way labor that have occurred since, including the effect of the 40-hr. week, the maintenance-of-way ratio (excluding charges to depreciation

At the left is a reproduction of typical sheets from the Lackawanna's roadway maintenance program book for this year

and retirements) in 1950 had dropped to 9.29. This reduction in the M/W ratio in the face of rising costs was achieved without sacrificing maintenance standards. In 1950 the Class I railroads in the Eastern region as a whole had an M/W ratio of 11.04 (also excluding depreciation and retirements).

General Maintenance Practices

A brief description of the Lackawanna's track-maintenance practices in general will provide a background to an understanding of the methods used to program roadway maintenance work in detail. The main line of this road, comprising from two to four main tracks, extends from Hoboken, N. J., on the east to Buffalo, N. Y., on the west. As of December 31, 1950, the road had a total of 2,394 miles of track to maintain. Typical heavy-duty main-line track construction consists of 132-lb. rail, six-hole head-free joint bars, double-shoulder "waffle-bottom" tie plates, 24 creosoted crossties per 39-ft. panel, and crushed limestone or trap-rock ballast. The tie plates on all main-line curves are lagged with one cut spike if waffle-bottom tie plates are used, with two such lag spikes being used if the tie plates are of the flat-bottom type. On main-line tangent track where other than waffle-bottom tie plates are used one lag spike is driven in each tie plate. The track is anchored as necessary to maintain the joint gaps in the rails.

Crossties are renewed on a six-year cycle, and in connection with this work the track is raised an average of 3½ in. and is tamped with a Multiple Tamper. At this time all ties are renewed that are not expected to last six years. Those that are unfit for further service are burned while those that still have some service life left are reinstalled in side or yard tracks. Either one or two years after the ties are renewed the track is given a light raise (about 1½ in.) and is tamped with a Matisa tamping machine. After another three years or more the latter operation is repeated if necessary.

A strong believer in the economy of a free-draining ballast section the Lackawanna cleans the shoulder and intertrack ballast in its main tracks on a regular cycle. Speno equipment is used for this purpose. Where the ballast is to be cleaned in track that is on the schedule to be raised the ballast-cleaning work is done in advance to facilitate the renewing of the ties. Ballast that is not on the schedule to be cleaned is scarified if necessary before the track is raised.

Before main-line track is raised all joints having batter in excess of .025 in. are built up by welding, generally using the strip method, and joints not requiring welding on this basis are ground. In advance of the track-raising work rails with engine burns are either removed or the burns are built up by welding.

Uses Detour System

An important factor in the Lackawanna's roadway maintenance setup is the practice of using the so-called "detour" system when carrying out track-raising and tie-renewal work. In this system, which has the wholehearted cooperation of the transportation department, all traffic is detoured around the track-raising and tie-renewal operation. The detour sections are five to seven miles in length, and, where necessary, temporary crossovers are installed to make this possible.

The handling of trains at detours is in charge of the transportation department. Each of them is protected by a conductor at one end and a trainman at the other, both of whom are in telephone communication with each other and with the train dispatcher. After working hours the "dead" track is restored to service until the following day. Generally speaking, the track-raising and tamping work involving the use of Matisa tampers (during which no tie renewals are made) is carried out under traffic.

The Lackawanna's track-raising and tie renewal operation involving the use of Multiple Tampers is highly mechanized.* Two such organizations of equipment are employed, one of which operates generally east of Binghamton, N. Y., and the other one west of that point. As seen recently in operation one of these gangs was using two Nordberg spike pullers to remove spikes from ties to be renewed, a Nordberg power jack, a power-driven tie puller which was devised and built on the Lackawanna, two Nordberg Cribex machines for cleaning ballast from the cribs to facilitate insertion of the new ties, two Nordberg spike hammers, and a homemade ballast loader-distributor by means of which ballast in the intertrack space is picked up and delivered to a hopper from which it is spread evenly over the track section.** This gang was comprised of a total of 95 men divided into five separate gangs, each under the supervision of a foreman. The advance unit of the organization consisted of a small group of men digging out ballast at grade crossings, using an Ingersoll-Rand Spot-Air compressor for operating cribbing forks, while bringing up the rear was a gang that dressed the track, sorted and piled ties and did other miscellaneous work, including the tamping of ties through turnouts with a Jackson 4-tool outfit.

Direct supervision over all maintenance-of-way activities on the Lackawanna is in the hands of the engineer maintenance of way, located at Scranton, who reports to the chief engineer, whose office is at Hoboken, N. J. Maintenance work on each of the road's seven subdivisions is under the supervision of a roadmaster, who reports to the engineer maintenance of way. Each division has from 5 to 14 sections which, in double-track territory, have an average length of about 15 miles of line. The work of the section gangs is confined largely to spotting, policing and patrol duty, with all heavy out-of-face work being done by extra gangs. Nearly all divisions have extra gangs that work the year around, but at the beginning of the working season these gangs are expanded in size and new ones are added as necessary to take care of programmed work. The heavy out-of-face maintenance operations are usually started about April 15. Activity continues to increase until about May 15, after which it remains on about the same level until about November 15, when a tapering off process is begun.

Under the present system of programming heavy roadway maintenance work, the engineer maintenance of way, begins, in the closing months of the year, to work out

*An article describing in detail the organization and procedure of these gangs and the equipment used will appear in the September issue.

**The new ballast needed in connection with the tie raise cannot be dumped between the rails because it would interfere with the removal of the old ties and the insertion of new ones. However, after the new ties have been installed and the track raised it is necessary to have stone to tamp the ties. For this reason the ballast is unloaded initially with side dump cars, and then, instead of using hand labor to throw it into the track as needed for the tamping work, this is done mechanically by means of the specially-developed ballast-loader distributor.

a tentative or preliminary program for the following year. Early in January a meeting is held by the president, and the chief engineer, to determine the money allotment for the year. On the basis of this allotment the engineer maintenance of way then adjusts his program as necessary and works out a final schedule which is usually completed about March 1.

Nothing in the way of information pertinent to carrying out the maintenance program is left out of the final schedule and incorporated in the book of blue-line prints mentioned at the outset. In this book the "winter force" for the entire railroad is first summarized by divisions, giving the number of section and extra-gang foremen and assistants, the number of section and extra-gang laborers and the number of other laborers. The winter force for each of the seven divisions is then tabulated in detail. The winter force might be said to be the road's basic maintenance organization, which is augmented as necessary during the working season to carry out the programmed work.

The program book then gives the "summer force," first summarizing it and then giving it in detail for each of the divisions. Since the organization and personnel of the extra gangs depends at any given time on the particular work scheduled for them they are simply referred to by number in the "summer-force" tabulations, with cross references to other tabulations which give in detail the work schedule for the extra gangs on each division. These latter schedules outline the work of each gang for the entire season, including the date on which each project is to be undertaken and completed. The job references for each gang include the type of work to be done, the number of the track involved, and the milepost limits of the work. The schedule also specifies the number of men to be included in the gang for each job, and the time it is to start work in the morning. In making up the work schedule of the various gangs at the beginning of the year allowance is made, based on past experience, for probable delays due to weather conditions. So accurate are the estimates in this respect that seldom do the gangs have occasion to deviate from the fixed schedule more than a day or so.

Also laid out in great detail in the work program for each year are all pertinent facts regarding the various types of work to be done. The types of work thus covered include track raising and surfacing, rail renewals, the changing out of joint bars, ballast cleaning, new switch timber and crosstie allotments, stone ballast allotments, assignments of ash pit cinders and the application of bridge tie preservative.

Schedules for Machines

Work schedules for the larger items of equipment are included in the program. Equipment so scheduled includes the company's three Matisa tampers, its two Jackson Multiple Tampers, a ballast scarifier, and a Nordberg Cribex, the latter machine being in addition to the Cribexes used by the track-raising gangs. Generally speaking, each of these tabulations gives the work schedule for the particular piece of equipment for the entire working season, generally indicating for each job the track number, the location of the work by milepost reference, the dates on which the job is to be started and finished and, in the case of the Matisa and Multiple Tampers, the numbers of the extra gangs that are to be working with each piece of equipment at any given time.

Also included in the program book are sheets giving the force setups for use with the Matisa and Multiple Tampers. These tabulations show the number of men in each unit of each gang, their duties, the equipment to be used, and the starting time. To assure that the gangs will be able to start work promptly at the appointed hour the starting times of the machine operators are made sufficiently early to give them an opportunity to service their equipment and to get it started before the gang goes to work. Footnotes on the tabulations indicate the starting times of the machine operators as well as other pertinent information not otherwise included in the tables. The final two pages of the book are devoted to brief descriptions of the Lackawanna's track-work methods and standards.

The Lackawanna's maintenance program book for 1951 contains 63 pages, not including the 1-page index or the covers. Complete copies of the book are kept by the chief engineer, the assistant chief engineer and the engineer maintenance of way. Each roadmaster is given copies of those pages of the book that apply to his territory, and sheets covering the activities of the extra gangs are placed in the hands of their foremen.

Program Shown Graphically

The work being involved in each year's roadway maintenance program, in addition to being included in the book described above, is also indicated graphically on blueprints of the road's rail charts which show, by conventions, the weight, the year rolled and the plant where rolled of all the rail on each subdivision. On blueprints of these charts the major elements of the maintenance program are indicated by lines and shading of different colors. The work thus shown includes all programmed rail renewals and whether the rail to be applied is new or second-hand, new splices to be applied, ballast to be cleaned, and track to be tamped, indicating whether the work is to be done by Matisa tamper, Multiple Tamper, hand forks, or pneumatic guns.

An interesting aspect of the Lackawanna's maintenance activities is the large amount of grading work that is now being done, largely with off-track equipment. This has involved a considerable amount of ditching and bank-widening work, the ultimate purpose being to provide a service highway along the railroad for the use of off-track machinery and trucks in locations where the railroad is not otherwise readily accessible to such equipment by other means. Much of the material needed to build the service highway is being obtained in connection with a program to widen cuts to make room for snow in territories where high winds are experienced. The railroad believes it is important to have a substantial roadway shoulder, not only to support the track but to reduce frost action under the track.

Work to be done by the bridge and building forces is programmed and scheduled in much the same way as roadway maintenance work. However, since so many unexpected jobs must be handled by the bridge and building gangs it is not possible to schedule the activities of these gangs with the same degree of precision as the track forces.

Metallizes Bridges To Combat Brine Corrosion

Pioneering in the technique of applying metallic coatings to bridge steel in territory where severe brine corrosion occurs, the Missouri Pacific employs a successful method for assuring a protective coating with a life of 20 years. As a result, the top flanges of floorbeams and stringers and of beam and girder spans of all new and second-hand bridge steel are metallized before erection.

• Although some railroads had experimented unsuccessfully in the past with the metallizing process as a means of providing a protective coating on their steel bridges against brine drippings and had given this up as being impracticable, the Missouri Pacific has persevered in its efforts in this direction and developed a method of application that produces a metallic bridge coating having an expected life of 20 years. Through the use of modern equipment, combined with intensive training of the crew, metallizing is accomplished at a cost ranging from $.75 to $1.00 a square foot of area. Moreover, confinement of the metallic coating to certain vulnerable parts of the steel spans has further enhanced the economy of the process.

The areas selected by the Missouri Pacific for metallizing are the ones found to be the most affected by brine corrosion and include only the top surfaces and edges of the upper flanges of floorbeams and stringers and the same areas of beam and girder spans. Also included are the top lateral plates whenever they are fastened to the top flanges of stringers. Other areas of the structures are considered to be sufficiently protected from brine drippings that the expense of metallizing them is not justified.

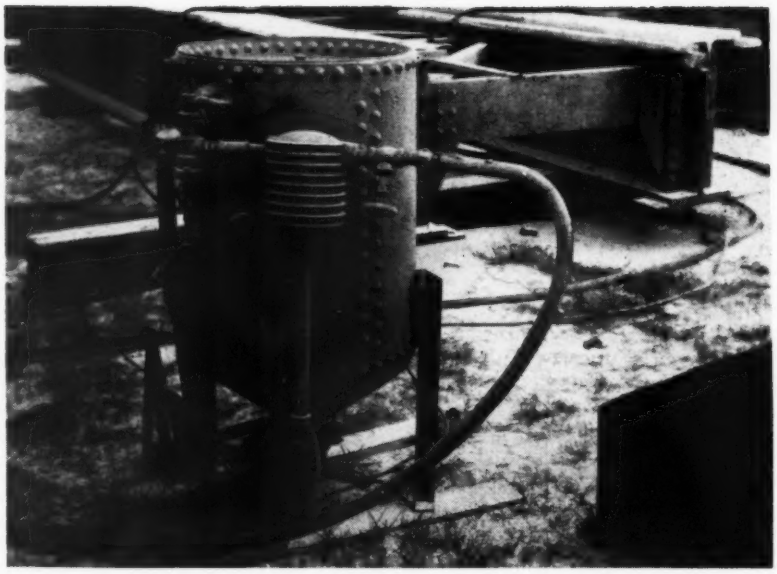
It is now the policy of the Missouri Pacific to apply a metallic coating to the above-mentioned selected areas of all new steel structures before they are erected. This policy also extends to all bridge spans which are removed from service and are re-usable. The metallizing work is carried out at a plant located in the road's concrete products yard at North Little Rock, Ark., where compressed air is available.

The metallizing process is much like the process of paint spraying. It consists essentially of spraying a molten non-corrodible metal on

The top surfaces and edges of the top flanges of a girder span are prepared for metallizing by sand blasting. Only a short section of the span length is cleaned at a time to preclude contamination before the application of the metallic coating. In this view, the bright portion at the far end of the girder has just been sand blasted and the sand particles and dust have been blown away from adjacent portion

thoroughly cleaned surfaces by using a special gun made by the Metallizing Engineering Company, Long Island City, N. Y. The noncorrodible metal is zinc in wire form fed through the center of the gun by means of a small feeding gear actuated by compressed air. Three hoses are attached to the base of the gun; one supplying compressed air, another oxygen, and the third acetylene. The oxygen and acetylene are brought together and ignited to form a hot flame, thus melting the wire that projects into the gun's nozzle. Immediately upon melting, the molten metal is caught by the compressed air and is discharged from the nozzle in spray form.

The nozzle of the gun is directed toward and held about seven inches above the surface being metallized. At this distance the spray definitely covers a spread of about one inch, although there is some zinc precipitated over a wider area, and the gun is moved slowly to insure uniform deposition.



The sand generator, known as the Sand Master, is portable and operates by compressed air supplied at 100 p.s.i. from lines in the yard. This unit holds about 1,000 lb. of a hard, coarse and sharp sand which is dried and screened before use and which produces a roughened surface on the structural steel for good bonding

The metal is applied by a special gun much like spray painting. The wire is melted within the nozzle of the gun by means of an oxyacetylene flame and the molten metal is blown from the nozzle by compressed air

Cleaning Is Important

The metal spray cools rapidly after being discharged from the nozzle, and is practically cold when it strikes the steel surface to which the protective coating is being applied. The resulting bond is merely mechanical. For this reason, the Missouri Pacific attributes much of its success in metallizing to the thorough cleaning given to the steel surface before the coating is applied.

The most practicable and satisfactory method found by the Missouri Pacific for cleaning the steel surfaces to be metallized is sand blasting. The road uses a very hard flint-like, No. 7 chatt sand, thoroughly dried and screened, for this purpose. The sand blasting not only removes all paint, rust, scale, salt, moisture and other foreign matter, but also roughens or scarifies the metal surface to insure adequate bond between the zinc and the structural steel. Only a small area of the structural steel is sand-blasted at a time, then the dust is blown off with compressed air, and the metal spray application is made immediately thereafter, before any water, dirt or other foreign matter can come into contact with the prepared surface.

The sand-blasting equipment consists of a Sand Master Generator, produced by the Ruemelin Manufacturing Company, Milwaukee, Wis., air hoses, and nozzles. The generator has a capacity of 1,000 lb. of sand and operates on an air pressure of 100 p.s.i., which results in a pressure of about 95 p.s.i. at the nozzle. A small sand-drying unit and screen is provided.

Metal Application

The metallizing work is carried out by three men. One man dries and screens the sand, another operates both the sand-blasting nozzle and the metallizing gun, while the third helps either of the other two in taking care of the various hose lines, and the unreeling of the zinc wire from spools.

Before commencing the sand-blasting operation, the men place boards on each side and just beneath the top flanges of the structural steel. This is done to confine the work to the selected areas and also to prevent the marring or disfiguration of the remainder of the structure. From 8 to 10 ft. of the length of the structure is

Although aluminum and bronze can also be sprayed, the Missouri Pacific uses zinc for metallizing its bridges to resist the corrosion induced by brine drippings. The zinc comes in wire form, ⅛ in. in diameter, and is unwound from a reel as needed by the gun operator. Care is exercised to keep wire free from dirt and oil

The operator applies the metal to about one square foot of area at a time, spraying the first and third coats transversely and the second coat longitudinally to the length of the girder until a uniform coating 0.012 in. in thickness has been obtained

then sand-blasted, after which the metallizing operation is begun.

The objective is to apply the zinc coating to a thickness of 0.012 in. When applying the metal, the operator begins at one end of the span and directs the spray back and forth transversely to the span length until about one square foot of area has been covered. He then shifts his position and sprays a second coat but works in a direction at 90 deg. to the first. He also sprays two coats along the edges of the top flanges. A light third coat is then applied to obtain the desired thickness. The operator then works on the adjacent areas of the surface, working on a square foot at a time, until further sand-blasting is required. In general, the metallizing operation is accomplished twice as fast as the sand-blasting operation.

Checking Coating Thickness

The operator has two means of checking and controlling the thickness of the metal coating. One is by the amount of zinc wire used and the other is by an electric measuring device which, known as the Elecometer, is imported from England. The zinc wire is ⅛ in. in diameter and comes in 80-lb. reels. The operator computes the length of wire needed for a small portion of the span by allowing ⅝ lb. per square foot of area, which theoretically will produce a uniform thickness of 0.012 in., and cuts this length from the spool. After the first two coats have been applied, he uses the Elcometer to determine the spots that need an additional application to produce the desired thickness. When the selected measured area has been coated, all of the wire cut off the spool should have been used up. If it has not, the operator again searches the coated area to develop the spots that require additional zinc, where metallizing is continued until the alloted wire is used up.

First Begun in 1936

The metallizing of certain parts of steel spans was first tried out on the Missouri Pacific on one of its Kaw River bridges at Kansas City, Mo., in 1936. The results obtained on the first job were not entirely satisfactory as the effective life of the metallic coating was only about 13 years. The railroad attributes this to (a) failure to clean the steel properly; (b) delaying the application of metal too long after the sand-blasting operation; and (c) failure to apply the metal in sufficient thickness. On this bridge the metallizing coating was made 0.008 in. thick.

Cost Data

The previously mentioned cost of $.75 to $1.00 for a square foot of area is for metallizing work done before the span is erected. Where application of the metallic coating is made to a structure in service, the cost runs approximately $1.25 to $1.50 per sq. ft., depending upon the density of traffic. This increased cost is brought about by the need for shifting the deck, the erection of scaffolding, and the larger force required for wheeling the sand out to the point of use.

With the 20-yr. expected life from the metallic coating, the road believes that the present method of protection is practicable, economical and effective.

As the level of the Mississippi river rose, train loads of rip-rap and sand bags were placed to combat embankment erosion

With slag ballast unloaded heavily, this gang, using a Multiple Tamper (background) raised and surfaced one of the main tracks

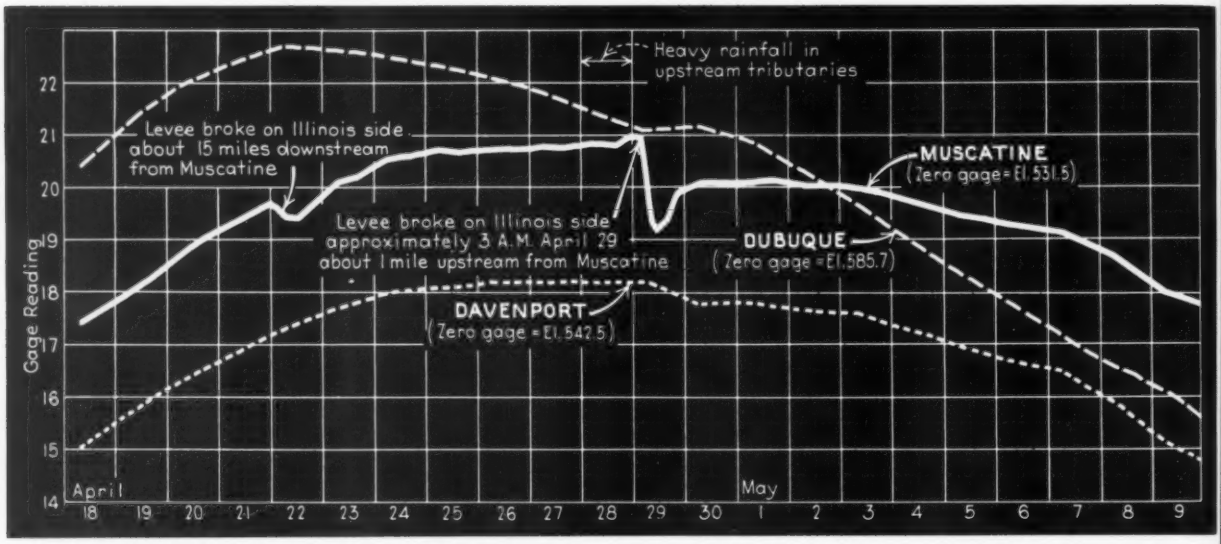


Chart showing Mississippi River stages at Dubuque, Iowa, Davenport and Muscatine during a critical three-week period

Rock Island Copes with the Mississippi

Heavy rains were filling the banks of Ol' Man River with more water than it has carried for over 70 years, and government engineers predicted high-water elevations that would affect about 25 mi. of the Rock Island's main track, with about 1 ¾ mi. subject to overflow. With 11 days advance notice, the railroad decided to race with time and the river by raising its tracks and otherwise protecting its facilities

• When it was reported, after a rainy spring, that floodwaters of the Mississippi river had reached the highest crest since 1881 on April 16, 1951, at St. Paul, Minn., there was a great deal of fearful speculation and excitement among the residents of towns downriver from that point. From its records of weather conditions and its knowledge of this river and its tributaries, the Corps of Engineers, U. S. Army, was able to predict, many days in advance, when the crest of the floodwaters would be reached at various points downstream from St. Paul. These prognostications did much to alleviate the forebodings of many of the shore residents and industries and gave others time to take measures to meet the oncoming high water. Among the latter was the Chicago, Rock Island & Pacific.

The portion of the Rock Island lying within reach of the Mississippi floodwaters is the double-track main line paralleling the river and extending from Nahant, Iowa (near Davenport), to Muscatine, the operation and maintenance of which is under the jurisdiction of B. F. Wells, superintendent. This line is also used by trains of the Chicago, Milwaukee, St. Paul & Pacific.

Upon consultation with the Corps of Engineers located at Rock

Another gang equipped with a power jack and a Power Ballaster made an 8-in. raise to grade stakes set by an engineering party

The sand bags, only about half filled to assure their lying flat without voids, were placed about 4 ft. from the tie ends

Embankment erosion became so general that stop-gap measures, such as floating poles, had to be used to reduce destruction

In some places wires on the telephone line had to be moved up to higher crossarms to keep them above the raging flood waters

on Its Latest Rampage

Island, Ill., the division engineer, F. P. Funda, learned of the predicted highwater crest elevations along the railroad and also that a crest at Stage 20.5 could be expected at Muscatine on April 27—11 days after cresting at St. Paul. Because of subsequent heavy rains, this forecast was revised upwards on April 19 to Stage 21.5. With this information it was developed from division records and a field survey that only about 9,000 ft. of trackage from Muscatine north would be in danger of being overflowed, to a maximum depth of about two feet.

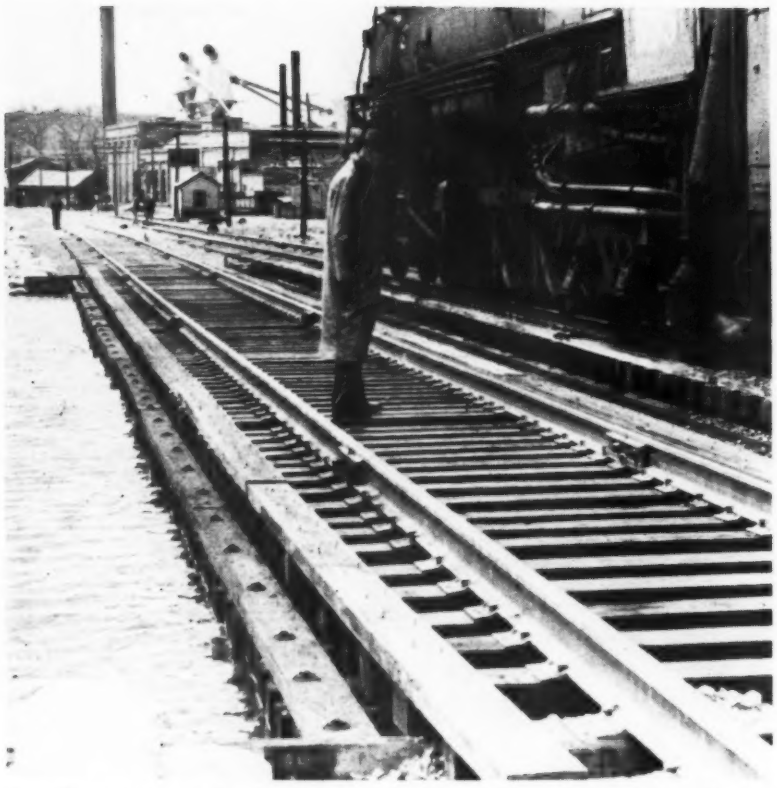
To maintain traffic, it was decided to race with the rising river waters and raise the track at this location above the predicted levels. The plan adopted called for sand-bagging and placing riprap on the river side of the railroad embankment and the raising of first one main track from 8 to 10 in. on slag ballast, followed by a similar raise of the other main track, and subsequent track raises until both tracks had been placed about 7 in. above the predicted crest level.

Carloads of sand, and bags in lots of 10,000 at a time, were shipped to Muscatine and about 25 men were employed in sacking the sand. The bags were filled a little more than half full to assure their lying flat without voids. A work train and from 8 to 10 men were employed in placing the sand bags, which were piled in a line about 4 ft. from the ends of the ties to provide sufficient distance for retaining the ballast used in raising the track.

Trainloads of slag ballast were moved from Chicago, and a gang of men, organized around a Nordberg power jack, a Pullman-Standard Power Ballaster and a Jackson Multiple Tamper, were set to work in raising and surfacing. An engineering party set grade stakes for all track raises on a gradient conforming to that of the expected crest slope of the river.

Bridge Is Quickly Raised

At the Muscatine end of the sag is a three-span deck plate-girder bridge, 110 ft. long, over Mad



Mad Creek bridge, a three-span deck-girder structure, would have been under water if tracks had not been raised by drift-bolting wood stringers flatwise to the existing ties and placing new bridge ties over them

Signal men built temporary wood platforms on which to place the batteries and relays from battery wells, then roofed them over

creek, which had to be raised 13 in. to keep the rails out of the water. The bridge forces raised the tracks over this structure by simply removing the rails and tie plates, laying and drift-bolting 7-in. by 16-in. wood stringers to the old deck, installing additional bridge ties over them and relaying the rails, plates and fastenings. The track raise at each end of the bridge was coordinated with the bridge raise. There are no other bridges, and few culverts, in this stretch. At the crest of the flood, the water rose to within 6 in. of the top of the rails on Mad Creek bridge.

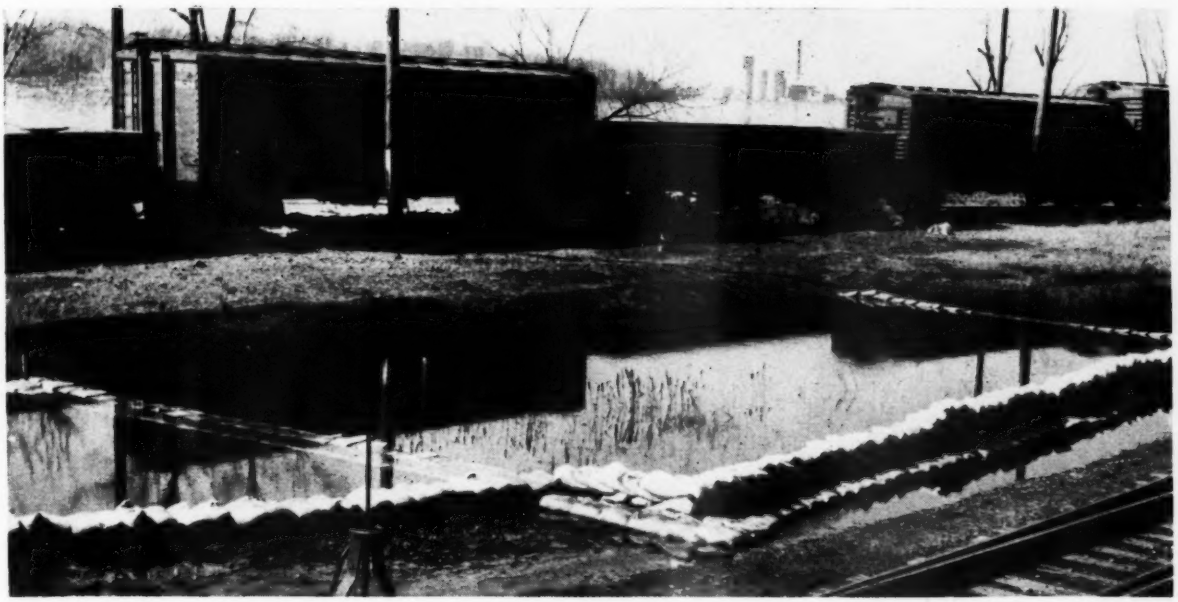
The signal forces also had to carry out some urgent work to keep the signals functioning. This work consisted of building temporary wood platforms, about four feet high, at all signals located on the river side of the tracks, removing the batteries and relays from the battery wells and placing them on the platforms, and erecting roofs over them. This work was done not only where track was raised but also at all points between Nahant and Muscatine where the battery wells would be subject to inundation.

In general, the wires of the telephone and telegraph lines were above the expected high water, but there were a few locations where the wires on the bottom crossarms were too low. At these places the wires were moved up and fastened to a higher crossarm.

Fighting Wave Action

When the river began rising, track walkers were employed on a 24-hr. basis to patrol the tracks between Nahant and Muscatine. These men observed and reported on the flood levels and the effect of the highwater on railroad properties. Wave and current action were reported to be eroding the railroad embankments at many locations, and riprap was ordered for placement at these points.

Two-man riprap was used, which was procured at a limestone quarry located near Nahant. About 24 Kilbourn-Jacobs and Austin-Western air dump cars, and an equal number of drop-bottom gondola cars, were used in work trains for hauling and unloading the riprap. The air dump cars were of the apron and the non-apron types and of 20 and 30-cu. yd. capacity. Each work train hauled one and some-



Where seepage under the embankment threatened to cause "water boils", the weakened areas were ringed off with sand bags

times two draglines on flat cars to assist in placing the riprap.

However, the embankment erosion caused by wave action became so general that the riprap placement could not keep pace with it, and stop-gap measures had to be employed to reduce the destructive action. These measures consisted at some points of using plank rafts or pairs of floating poles, 18 to 20 ft. long, fastened together about 4 ft. apart and tied to the shore with baling wire. At still other locations, snow fences as well as woven wire was used, with straw placed between the snow fence or wire and embankment, then the mat was weighed down with sand bags at the bottom and anchored with wire at the top.

Seepage Control

In the industrial area of Muscatine, seepage under the embankment became a problem and threatened to inundate the railway yards. Water service men set up one 4-in. and two 2-in. pumps, which were operated 24 hr. a day, for pumping the water from the yards. It later developed, however, that at some spots the seepage was more rapid than others and the danger of "water boils" became imminent. It was noted that the pumps were not keeping abreast of the seepage water, so the weaker spots were ringed off with sand bags. The bags were piled only about 2 ft. high in these rings but the water confined within the ringed areas served to reduce the head of water behind the seepage, thereby enabling the pumps to get the situation under control.

At Dubuque, Iowa, about 125 mi. upstream from Muscatine, the floodwaters of the Mississippi reached their crest on the morning of April 22. Four days later, the crest was at Clinton, Iowa, which is 63 mi. upstream from Muscatine. On April 26, the crest was at Nahant and at Muscatine. Up to this point the track-raising work progressed according to plan but heavy rainfall occurred in upstream tributaries which caused the river level to rise at Muscatine and overtake the raising work. Consideration was then given to abandoning the work on one main track and concentrating the raising on the other to keep at least one track above high water.

However, on April 29, a levee on the Illinois side of the Mississippi broke and caused a drop of 1.8 ft. in the river level, leaving both tracks above highwater. From then on, although the effect of the heavy rainfall in upstream tributaries again raised the level for two days after the break in the Illinois levee, both tracks were successfully kept above high water. The raising operation was then completed and the tracks given a finished surfacing. The water reached its highest level, at Stage 21.0, at Muscatine on April 29, with a flow of 230,000 sec.-ft., and no doubt would have reached Stage 21.5 as predicted by the Corps of Engineers had it not been for the break in the levee.

A total of 250 carloads of slag ballast and some 150 cars of riprap were used in this fight with the Mississippi river. About 40,000 sand bags were also used, of which 10,000 were placed in fighting the wave action. Approximately 175 men were engaged in this struggle.

Except for some delays caused by work trains, normal traffic was maintained over the line during the raising work. Two trainmasters were assigned to this territory to expedite the operations of both revenue and work trains. The roadmaster was on the job all of the time and an assistant was assigned to take over part of the supervision. However, the Rock Island does not single out any one man or group of men for special credit in winning this race with time and the Mississippi river, but attributes the success of this work to the close cooperation given by the U. S. Corps of Engineeers, and men of their operating, engineering, track, bridge and building, water service, signal, telephone and telegraph, and the store departments. The heads of these departments and many members of their staffs came from the general and district offices to Muscatine to cooperate with the division forces.

How to Make
Low-Cost Concrete Freight Platforms

To replace wood platforms made obsolete by the mechanization of freight handling a new form of construction has been developed, which consists of a concrete floor on a solid fill retained by precast concrete wall slabs fitted to rail columns. The author describes these new platforms in detail, tells how simple they are to construct and how well they meet the needs of modern freight facilities.

By L. E. PEYSER
Architect, Southern Pacific
San Francisco, Cal.

• Up to recent times elevated freight platforms of wood construction have been relatively low in first cost, and have been thought to be economical of maintenance. However, changes in methods of handling freight, together with rising costs of labor and materials, have made this type of structure costly to maintain.

The general practice, in the past, of moving freight by hand trucks, dollies, rollers, and other manual means did not impose excessive loads on the floor sub-structure. For that reason the greatest part of platform maintenance consisted of replacing wood decking material worn by the metal wheels of hand trucks.

With the increased use of mechanized freight-handling equipment, such as lift trucks, the substructures of wood platforms have been found to have insufficient strength to sustain the greatly increased loading. Rapid deterioration has resulted. In this process deck planking also becomes loosened due to increased deflection, resulting in rapidly mounting costs for maintenance, and an added accident hazard.

Search for Better Design

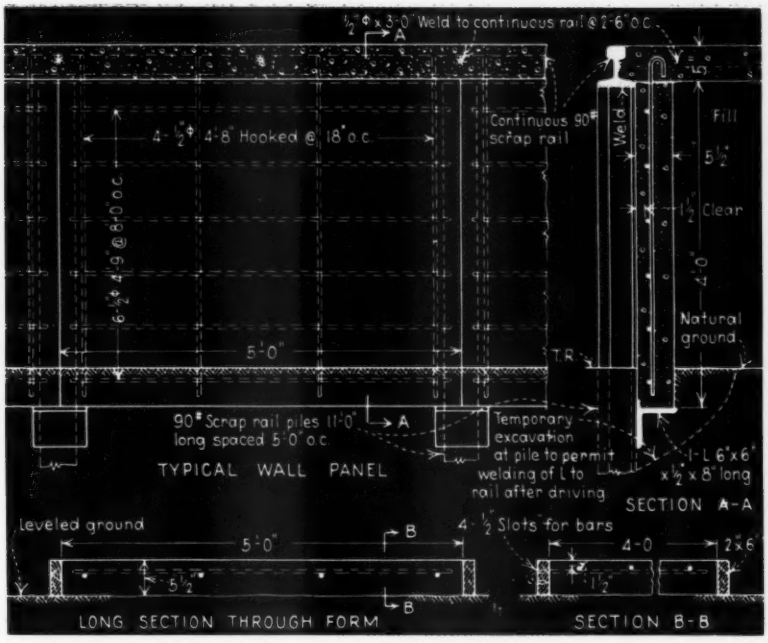
Consequently, we set out to develop a platform of more permanent construction that would sustain the increased loads of lift trucks, yet would not only be reasonably low in first cost, but low in maintenance expense. Our studies indicated that the most satisfactory floor surface to meet these requirements would be concrete on a solid fill. Normal construction practices for containing such fills call for concrete retaining walls, poured in place. The cost of this type of construction is relatively high, particularly in the case of long, relatively narrow platforms, and a less costly form of construction was sought.

This search resulted in the development of a plan that has afforded a satisfactory facility consisting of a concrete floor poured on a solid fill contained on each side by precast concrete wall slabs held in place by steel rails driven vertically into the ground.

Rails Driven on 5-ft. Centers

In this design, scrap 90-lb. rails, 11 ft. long, are driven on 5-ft. centers around the platform area until their tops are level at about 6 in. below the finished floor line. The rails are so placed that their bases face toward the inside of the platform. A continuous stringer of rail of the same weight is welded to the tops of the piles. Steel anchor bars are welded to the inside webs of the rail stringers and carried back into the floor area to act as ties between the rail piles and the concrete floor.

Steel angle clips are welded to the inner sides of the rail piles, at a point somewhat below natur-



The platform shown above and below consists of a concrete floor poured on a solid fill contained by precast wall slabs held in place by rails driven into ground. Details are given in drawing

al ground, to form a shelf for supporting the precast wall units flush against the bases of the rail piles.

Making the Precast Slabs

The retaining-wall units are reinforced-concrete slabs, 5 ft. by 4 ft. in plan and 5½ in. thick, precast in wood forms placed on an area of leveled ground. After the reinforcement has been placed the concrete is poured and the exposed face floated to a plane surface. The possibility of the underside being rough is unimportant, since it becomes the inner face of the wall.

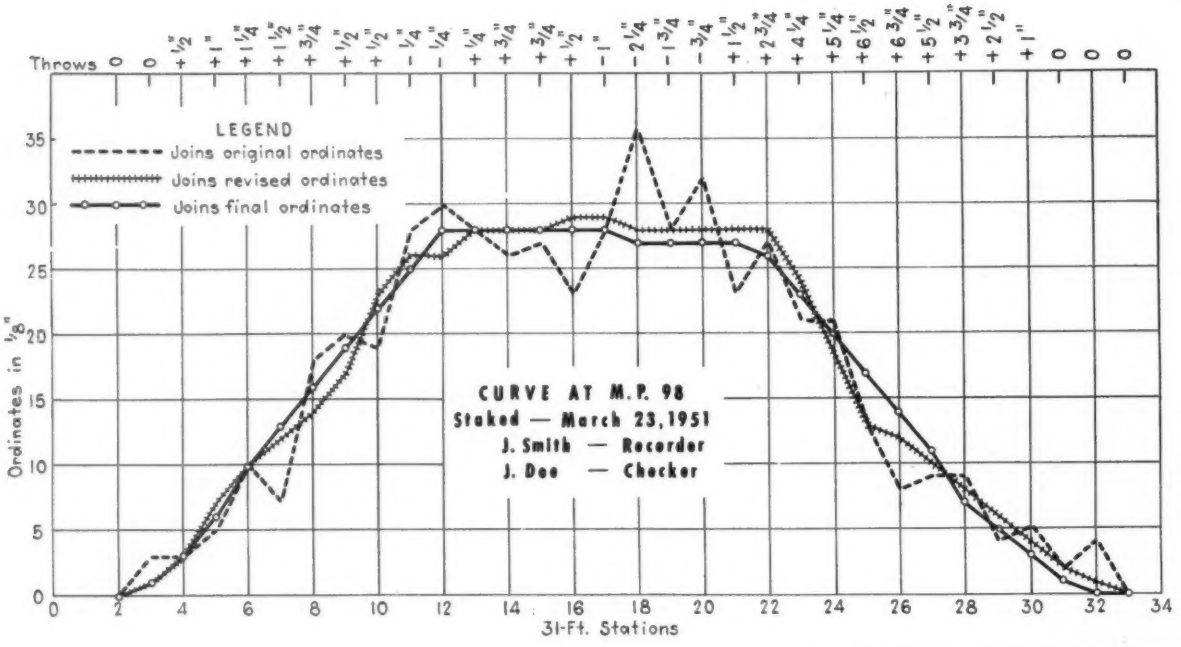
The forms are simple frames of 2-in. by 6-in. wood members set on edge, drilled where necessary for the passage of the reinforcing bars which extend beyond the edge of the slab. It is economical to make these forms in long lengths of parallel 2-in. by 6-in. members with 1-in. spacers set at 5-ft. intervals. Vertical reinforcement bars are extended through the forms on the top edge and hooked to tie into the concrete floor slab when it is poured.

After proper curing the precast units are lifted by a mobile crane, and installed against the backsides of the rail piles, resting on the steel-angle clip brackets. The platform fill is then placed, thoroughly compacted and the concrete floor slab poured in place.

In locations where there is some doubt as to the ability of the natural earth to sustain the pressure of the fill against the rail piles, these piles are set in bored holes which are later filled with concrete. This affords additional bearing surface to withstand the pressure.

Where there is possibility of trucks striking against the platform, a horizontal continuous scrap-rail member is welded to the outer face of the rail piles at an appropriate level to serve as a bumper.

In actual construction the cost of this type of platform is from 30 per cent to 40 per cent more than a similar wood structure. It is believed, however, that its permanence, its low maintenance costs, and its fire resistance, make such a platform well worth the higher first cost.



By plotting measured and revised ordinates as shown here, spots where improvement is possible can be seen at a glance

String-Lining "Kink" . . .

Graph Provides Visual Record of Curve Alinement

By RAY MacDONALD
Canadian National, Halifax, Ont.

• String lining of curves has become so common as a means of simplifying the maintenance of track that almost every "string-liner" has devised his own "tricks of the trade" to speed his work or give him better results. One of the "kinks" that has helped me to make my string lining more effective consists in keeping a graphical record of my string-line notes, including original ordinates, revised ordinates, throws, clearances, and, in some instances, elevations.

The compilation of this useful, visual record is quite simple. Any standard arithmetic graph paper can be used, from Lefax-size to the 1-in. by 1-in. cross-section type. I prefer the latter. On that paper it is convenient to plot the station numbers an inch apart on the horizontal scale and the ordinates on the vertical scale so that each division equals a ⅛-in. ordinate.

If string-line notes are worked up in the office as ours are, it is advantageous to plot the original ordinates and connect them with a red line before the curve is figured. By doing this, as pointed out in the A.R.E.A. Manual, "the ends of the spiral, as well as the points of compounding (if any), can be determined readily and an estimate of the average ordinate to use on the circular-curve section can be closely determined".

As soon as the notes have been "figured", the revised ordinates should also be plotted, and connected by lines preferably of a different color than used for the original ordinates. After this is done, a single quick glance will often detect spots where considerable improvement is possible.

For evidence of this, consider the accompanying chart. Before plotting the revised ordinates, the curve was roughly figured so that the spiral on the left, or beginning end, would have ordinates of 1, 3, 7, 10, 12, 14, 17, 23, and 26. These were at first thought to be sufficiently uniform to give a satisfactory "ride", but after plotting them on the graph it could be seen that the break between stations 13 and 16 was anything but smooth. Furthermore, since the plotting of the string-line notes showed that the average ordinate should be in the neighborhood of 28, representing a 3½-deg. curve, the spiral was refigured with a final result as shown by the circled ordinates.

Another quick glance at the chart shows that the righthand runoff is also uneven. With a few additional calculations this too was smoothed to the uniformity shown but with a disadvantage that it required large throws. However, with runoff elevations established on each side of these spirals according to the final ordinates, and the track thrown to give the uniformity shown by the plotted graph, the curve will surely "ride" well.

Thus it can readily be seen that the time spent in plotting the chart was quickly repaid by the speed with which a better result was obtained. However, this is only the first of the benefits of making a chart record of string-line notes. Other benefits are also available. For instance, such a chart is quite handy in the event the curve starts to "ride" rough after it has been lined. In such case it is easy to retake string-line notes, possibly only of the rough section of the curve, and plot them on the record chart. This can be done quickly and gives an immediate indication of the changes that have occurred since the curve was

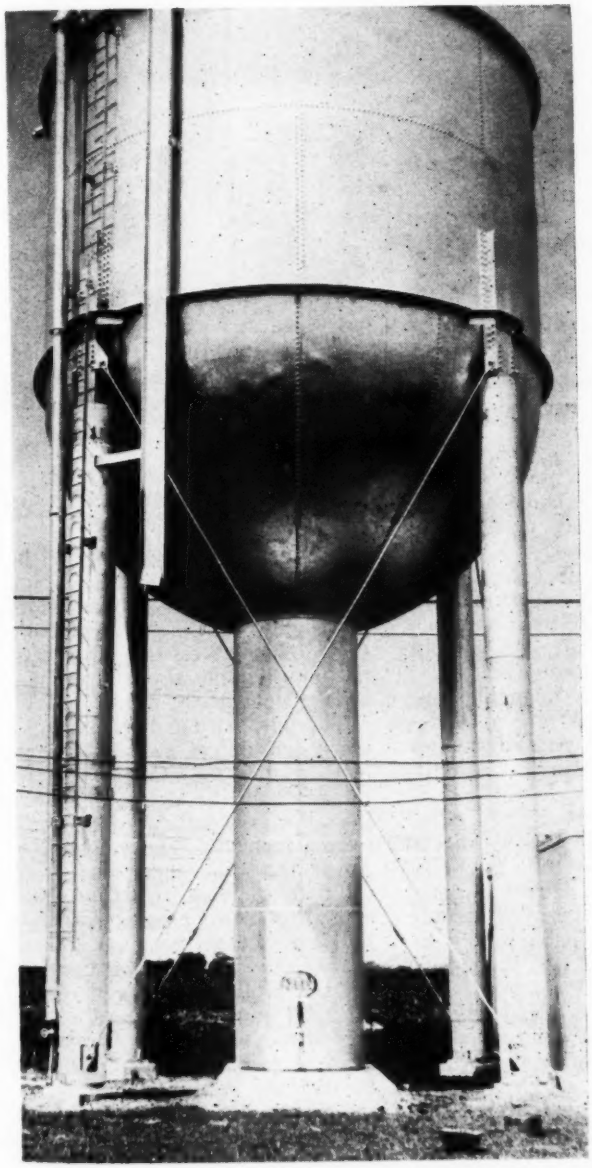
staked. From the knowledge thus gained, it is relatively easy to ascertain what has caused the change.

One of the principal advantages of keeping chart records of curves is the fact that their simplicity permits anyone even totally unfamiliar with string-lining techniques to visualize the conditions before and after curves are staked.

However, caution is necessary sometimes in showing one of these charts to a foreman for the first time. To a person unfamiliar with string lining, the graph appears to be a reproduction of the curve itself. This, of course, is not true. However, after a foreman has been shown that the graph represents only the relative lengths of the mid-ordinates, he is usually quick to see the advantages of string lining in obtaining spirals uniformly increasing in curvature until the simple curve is reached. This is a result that few, if any, foremen could obtain perfectly by eye alone.

Finally, although nearly all string-liners preserve their notes, charts made from them can be kept just as handily and can preserve for each curve an authentic, visual and easily understood record of its "before" and "after" condition. As such, they are to the roadmaster and track supervisor what "as-built" plans are to the construction engineer, designer or maintenance man—indispensable.

Converts Water Tank Into Fuel Oil Reservoir



Once a water tank, now a diesel fuel oil reservoir

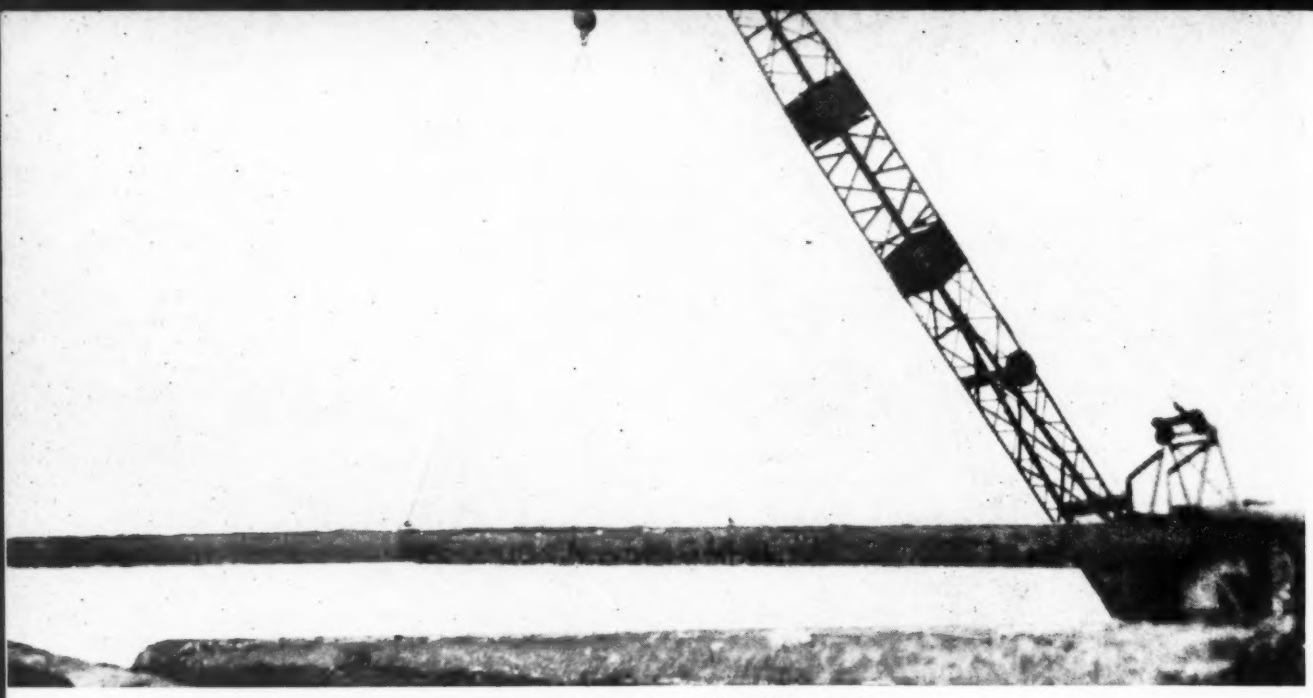
• The Toledo, Peoria & Western, completely dieselized since February, 1950, recently converted an obsolete steel water tank into a fuel-oil tank. As a result 55,000 gal. of additional storage capacity for holding reserve supplies of diesel fuel oil was acquired at a nominal cost, and the expense of dismantling the tank was avoided.

Located at Webster, Ill., about four miles from the eastern terminus of the road, the tank, during the days of steam operation, was a part of one of the road's most important watering stations. It is 24 ft. in diameter and is supported on a four-legged steel tower 25 ft. high. The tank is roofed, and its bottom funnels into a 50-in. standpipe, from the bottom of which water was formerly discharged through underground piping to a standard water crane. Water was pumped into the tank from two wells. The tank was erected in 1937, and at the time of conversion was generally in a very good condiditon.

The conversion work was simple and relatively inexpensive. The inside of the tank was cleaned and painted; the standpipe was plugged at ground level by welding a steel plate across the inside of the pipe (access for this work was gained through an existing manhole); a 3-in. discharge pipe was tapped into the standpipe about 18-in. above the steel plate, thus providing space below the discharge pipe for the collection of sludge, which can be removed when necessary through the manhole; and the inlet piping which discharged into the top of the tank was cut at the tower base and a connection was installed in the pipe to which oil lines could be coupled to fill the tanks. The pumps and large valves in the pumphouse were salvaged, and the water crane was removed. The underground piping, however, was abandoned.

In addition to the above, the conversion work included incasing the tower legs in Transite pipe. This was necessary to comply with a state fire ordinance which requires that the columns supporting an elevated fuel oil tank be made fire resistant to prevent buckling in the event of fire. The fire laws also required a special "inside pressure" valve to be installed in the discharge line. This valve is provided with a fuse which disintegrates under heat and thus causes the valve to close instantly if a fire breaks out.

The tank conversion work described above was carried out by company forces under the direction of H. H. Main, chief engineer of the T. P. & W., and R. H. Egbert, assistant chief engineer.



Lifting a 70-ft. fender log by two equal-length slings equipped with Esco hooks

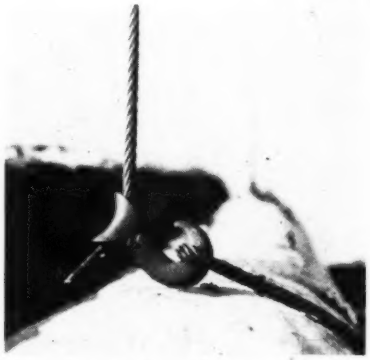
How to Unload Long Piles Safely

Here you have, right from an expert's pen, ways to handle the difficult job of unloading piles without personal injuries. Out of his wide experience in bridge work, and salvage operations, which have gained for him a reputation as an authority on all the practical phases of pile work, the author tells in down-to-earth language the "tricks of the trade", warns of the dangers involved, and advises how to cope with them.

By W. F. MARTENS
General Foreman Bridges and Buildings, Atchison, Topeka & Santa Fe, San Bernardino, Cal.

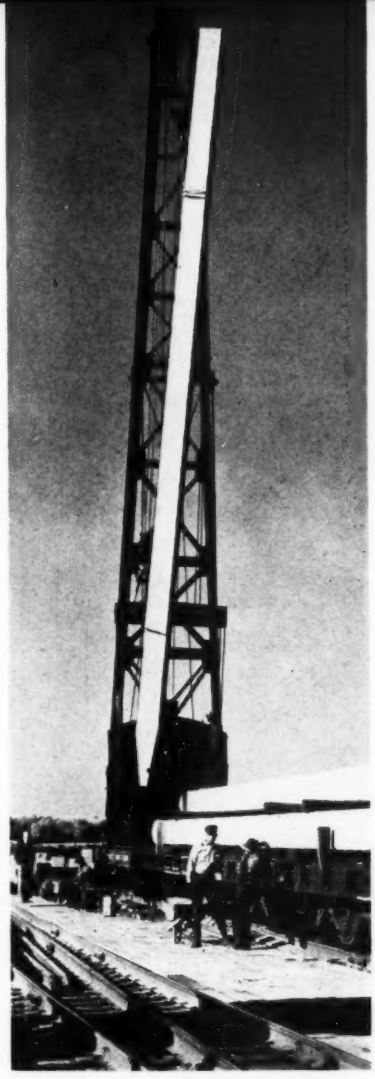
• The unloading of long timber piles and, particularly, creosoted ones, with maximum assurance against personal injury to the workmen, can be best accomplished by using a locomotive crane having a boom sufficiently long to lift them horizontally over the tops of the car stakes, and thence lower them to rest at a desirable location. Two cargo slings (wire rope) of equal and proper length, and each equipped with an "Esco" hook, as shown in an accompanying illustration, are well suited for this purpose. A "Pedro" hook, often used for this purpose, is similar to an Esco hook, except that the eye through which the cable passes is like the eye of an eyebolt and, therefore, wears out the sling much faster than an Esco hook. Equipped with either of these hooks, slings can be fastened at two suspension points or removed from the pile with minimum effort, and without seriously bruising the wood.

If the terrain is favorable, off-track equipment of proper capacity may be employed advantageously for this purpose. Also, a standard on-track pile driver can be utilized to unload long piles; but, of course, with the pile driver it will require more time to obtain comparable results. However, done with care, the task can be accomplished with reasonable safety to the workmen. With the leads raised, the driver is spotted fairly close to the end of the load, the best location being determined by trial. The pile hoisting line, which has been reeved through a snatch block previously fastened to the leads, is attached to the near end of a pile. The snatch block should be attached to the leads at an elevation that will permit raising the forward end of the pile being unloaded so it will float clear of adjacent piles as it is pulled endwise toward the driver, the far end of the pile skidding along on the material below it.



Equipped with Esco hooks, such as this, slings can be easily fastened or removed

The pile hoisting line is dogged when the end of the pile has almost reached the snatch block, after which the driver is pulled away from the load a distance that will overbalance the pile. The pile driver leads are then swung out so that the pile will land far enough away from the track to permit moving the machine toward the middle of the pile for the final lift and while the far end of the pile still rests on the end of the loaded car. If possible, the second hitch should be made far enough beyond the center of gravity of the pile to permit raising the far end high enough to swing it to the side of the car in the clear. In some cases, after the second hitch



Heavy and flexurally weak, precast concrete piles require careful handling

has been made, it may be necessary to raise the pile up to horizontal position and move the machine away from the load far enough for the far end of the pile to clear the load, before swinging it into the clear and lowering it to the ground.

A pile driver can also be used in connection with a single-line parbuckle, in which case the pile hoist line is looped around the pile near the center of gravity and is passed through a snatch block located on the far edge of the top of the load, the snatch block being attached to a stake pocket by a chain or wire rope. The piles are rolled off into the "bight" of the cable and then eased down two skids placed at proper intervals and slope.

When long piles have to be unloaded by hand, the method or procedure is somewhat dependent upon the way the piles are loaded on the cars by the supplier. Also, the terrain at the unloading site is a factor to be considered. Irrespective of the method or procedure adopted, there is always a potential personal injury hazard involved, and extreme care must be exercised and every move well planned and supervised in order to handle the job safely.

The unloading can be done with less effort and with a greater degree of safety if two 3-in. by 10-in. or other timbers of suitable dimensions are placed across the full width of the car between each tier of piles when loaded. By placing a block of wood of proper size on the ends of each of these timbers and against the outer side of each outside pile, all stakes can be removed from one side of the car and the piles rolled off one at a time. Two skid timbers of sufficient strength and length, and properly spaced, are required. The lower ends of these timbers should be embedded in a shallow hole in the ground the correct distance from the side of the car, and the upper ends sloped to and made to rest either against the side of the load or the edge of the car floor, depending on the height of the load and adjacent terrain.

The side of each pile being unloaded must be lined up with the ends of the 3-in. by 10-in. separator timbers to assure that both ends of the pile will leave the car simultaneously. Otherwise, the tip end, being of a much smaller diameter than the butt, will travel as the stick goes overboard, allowing the tip end to strike the separator timber hard enough to slew it with terrific force if only one or two piles remain on the far end of this timber. For this reason, workmen should be required to station themselves in the area between the two separator timbers to avoid possible personal injury if a pile is inadvertently rolled off in this manner.

Two manila ropes may be used for parbuckling piles to the ground, one rope being used near each end looped around the pile and fastened on the far side of the car. The other end of the rope, which passes over the top of the pile, is passed around a suitable object a sufficient number of turns to permit full control of the pile as it passes down the skids to the ground.

When long piles are fully nested, as shown in Figures 30 and 32, Sketch 4, pages 102 and 105, respectively, A.A.R. rules covering the loading of commodities on open-top cars, effective June 15, 1947, where nothing more than strands of wire are required between opposite stakes, the problem becomes more difficult and hazardous. Under such conditions, it is usually best to cut off only enough of the upper ends of the car stakes at a time to permit unloading the top tier of piles, the operation being repeated for each succeeding tier until the unloading has reached a point where all of the stakes can be removed from the pockets and the remainder of the material unloaded with safety. Skids, as previously described, should be used. Also, the piles may be parbuckled to the ground. However, it will be a little more difficult to attach the manila ropes since there are no separators between each tier of piles.

Metal or Concrete Piles

Long-fluted and steel-pipe piles, owing to their thin shells and relatively light weight, can be unloaded in the same manner as long wood piles. Long steel "H" piles, due to their heavy weight, should be unloaded with power equipment. If course, if only a few are involved and they can be skidded off on supports somewhere near the elevation of the car, they can be unloaded by the use of metal skids or on wooden skids on which flat steel bars or rails have been placed to reduce friction.

On account of their greater weight and their relatively low flexural strength, precast concrete piles will require more time and care in unloading than do timber and metal piles, and one or two power cranes of proper capacity should be employed. Handling stresses must be kept within certain limits, and as many as six suspension points may be needed if piles of record length are involved.

The matter of flexural stresses is usually given due consideration by the designer, who generally provides eye bolts or other special devices at the various points of suspension for convenience and safe handling. Therefore, the field forces need only be concerned with providing proper and adequate rigging equipment. This may consist of either an elaborate equalizer or a system of wire-rope slings. In any case, the type of rigging used must be such that the reactions are equal at all points of suspension when the lift is made.

Pertinent Pictures of the Month . . .

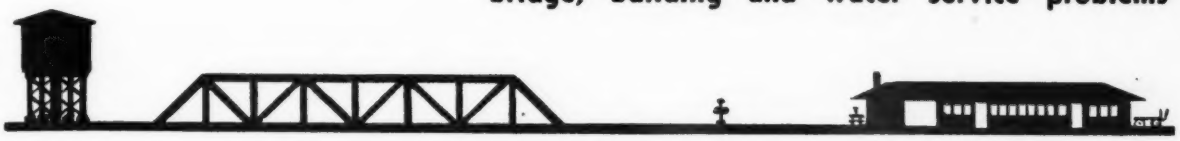
TO HAUL IRON ORE from around Knob Lake, Labrador, to tidewater at Seven Islands, Que., North America's newest major railroad—the Quebec, North Shore & Labrador—is being pushed through nearly 360 miles of the type of country shown above. With completion set for 1954, this year's schedule calls for working north from Seven Islands to Mile 75; from Wacouna (Mile 97) south to Mile 90 and north to Mile 125; and from Knob Lake south to Mile 330. Supplies and equipment are being "air-lifted" to Wacouna and Knob Lake to facilitate work from those points. Picture shows the Wacouna airstrip.

A FITTING INTRODUCTION to the modern general office building which the Minneapolis & St. Louis has constructed at Minneapolis, Minn., is the main lobby shown here. Its most impressive feature is the matched walnut veneer with which it and the adjoining main corridors are lined from the floor to the ceiling. To be certain that uniform grain and texture would be obtained, all of this veneer was peeled from the same log. Floors of the lobby and adjoining corridors are of terrazzo.

TO SPEED UP SERVICE and increase efficiency, the Southern has spent $3,000,000 in making its freight terminal at Knoxville, Tenn., known as the John Sevier yard, "the most modern in the south". As rebuilt the yard is a single integrated layout planned for the uninterrupted flow of cars from inbound trains, through a "push-button" hump-retarder classification yard and into outbound trains with least lost motion. The picture is a view of the yard looking east over the main retarder.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



How Long to Mix Air-Entrained Concrete

What effect does the time of mixing have on air-entrained concrete? How does the effect differ, if at all, when using, on the one hand, air-entraining cement or, on the other, normal cement with an air-entraining agent added at the mixer?

Trial Batches Are Advisable

By M. Hirschthal
Consulting Engineer, New York

In the early days of the use of air-entraining additions or admixtures a varying time of mix had to be determined for the different uses. In explanation, an "addition" is the term used where the Vinsol resin or Darex* (whichever is used as an air-entraining agent) is added to the cement at the time of grinding and is a constant constituent of the cement. An "admixture" is the term used when one of these materials is added at the mixer at the time the aggregates, cement and water are being mixed. It was therefore found necessary to mix a longer time when an admixture was used in order to obtain the required amount of air-entrainment (although a great amount of variation of this was found in the early stages). In later developments these admixtures were supplied in the form of a neutralized solution. This is the present practice and differentiation in time of mix is no longer necessary.

William Lerch made extensive tests and studies in the Portland Cement Association research laboratories on the various factors entering into air-entrainment, and one of the factors studied was the mixing time. He found that when the time of mix is increased from 1 to 5 min. the air content was increased 1 per cent. During the next 5 min. of additional mixing there was no change in the air content. After 10 min. of mixing the air content was found to be gradually reduced so that, at the end of 60 min. of total mixing time, it was the same as after the 1-min. mixing time. This would indicate that transit mixing would be safe up to an hour.

However, regardless of whether air-entraining cements or admixtures are used, trial batches should be made and tested prior to the beginning of the actual "pouring" of the concrete, to determine both the amount required for the percentage of air-entrainment specified and the change in proportions, particularly the reduction in the amount of sand to be used in the mixture to obtain the concrete strength of the resulting cylinders. These items should then be checked periodically during the course of the work.

The Highway Research Council, after an extended period of research, has come to a conclusion similar to that stated above. "Experience indicates", it states, "that the maximum amount of air is entrained in about 15 to 30 min. in a truck mixer and that, thereafter, the air content is gradually reduced by the mixing or agitating action. However, after adequate mixing has been done, the relationship is not so critical as to cause undue difficulty in exercising the necessary control. Precautions should be taken to insure that concrete used in structures subjected to freezing and thawing contains

*Two other air-entraining agents, namely N-Tair and Airalon, have been accepted by the American Society of Testing Materials.

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the October Issue

1. What type of work equipment is best suited to ditching and maintaining ditches along the right of way? In earth cuts? In rock cuts? In level country? Explain.

2. When prefabricated metal buildings are used that are to be heated, what is the best method of insulating them, taking into consideration fire resistance and first cost? Explain.

3. When joints of cast-iron or concrete pipe culverts become separated under main tracks, how can effective repairs be made? Explain.

4. In the renewal or replacement of trestle bridges, to what extent is it practicable for a railroad to standardize on steel, concrete or timber structures? How do year-to-year changes in the relative prices of these materials affect such standardization?

5. To what extent should the handles of snow brooms be equipped with steel scrapers for the removal of snow, ice and dirt from switch points and other locations? Why?

6. What are the advantages and disadvantages of heating coach-watering hydrants electrically to keep them from freezing? How can it be done effectively? Explain.

at least the minimum air content (about 3 per cent) required for increased resistance to such weathering. This applies to air-entrained concrete whether made with an air-entraining cement or an air-entraining admixture."

Maximum Air in Five Minutes

By L. H. Corning

Structural and Railways Bureau, Portland Cement Association, Chicago

The time of mixing has relatively little effect on the air content of air-entrained concrete regardless of whether the concrete is made with air-entraining cement or with normal cement and an air-entraining agent added at the mixer. The importance of mixing time on air-entrained concrete has been over-emphasized because in the early stage of its development powdered or flake Vinsol resin was used which had to be saponified by chemical reaction with the cement in the mixer before it entrained air. Under such circumstances, the amount of entrained air would increase considerably in some cases with continued mixing.

The introduction of neutralized Vinsol resin and other air-entraining agents which do not depend on the chemical reaction with the cement for saponification has minimized the effect of mixing time on the air content so that it is not materially changed with longer mixing.

Tests of air-entrained concrete made both with air-entraining cement, and with normal cement and an air-entraining agent added at the mixer, show that the air content is increased about 1 per cent when the mixing time is increased from 1 to 5 min. It then remains practically the same with 5 min. additional mixing. When the mixing time is extended beyond 10 min., there is a gradual decrease in the air content, and after 40 to 60 min. of mixing it is about the same as that obtained with 1-min. mixing.

When long mixing and agitating periods are to be used, such as in ready-mix operations, necessary control should be exercised to see that the proper amount of air (3 to 6 per cent) is obtained. This can be done easily by adjusting the mix or the amount of air-entraining agent added at the concrete mixer.

How to Prevent Scour in Ditches

Where ditches having heavy grades must handle a large volume of water, what steps can be taken to prevent scouring?

Comprehensive Plan Needed

By E. M. Loebs

Chief Engineer, Chicago & Illinois Midland, Springfield, Ill.

This is not an easy problem nor one which can be remedied by hasty methods. A long-range plan should be initiated after a careful study has been made of the type of soil, drainage area, gradients and the general condition of the land adjacent to the railroad right of way. Such a plan should include seeding, planting, check dams, crib walls, and in some instances riprapping of slopes and ditch bottoms.

Necessary arrangements should be made with adjacent land owners for them to seed, plant and install check dams on their property along draws and ditches which flow onto railroad property and into railroad ditches. Slopes on the railroad property adjacent to the drainage ditches should also be properly seeded and planted to secure the root action necessary to hold the soil and retard the flow of water.

It may require quite a few years before some measure of success can be realized after such a program of soil erosion and retardation of flow has been commenced. For the first few years, maintenance work will be required to improve and strengthen the weak spots in the over-all program. Ties removed from track can be used in the building of check dams and crib walls, and if installed and anchored properly will last quite a few years.

The tree plantings are generally closely spaced to keep growth confined, but at the same time are placed far enough apart to take advantage of full root action and holding power of soil. Where ditches are relatively close to tracks, the trees that reach full growth can be trimmed down if they obstruct visibility, without damaging the root structure.

The initial expenditure of such an over-all planned program may seem considerable at first, but once these control measures are effectively initiated and the plan is carried through for several years with determination and vigilance the annual cost of maintenance of ditches and slopes will be reduced considerably.

Two Methods Are Effective

By R. M. Schmidl

Draftsman, Illinois Central, Chicago

When ditch erosion is not checked, the roadway and backslope are undermined, leading to unstable track and frequent landslides. Ditch erosion or scouring can be effectively prevented in two ways. These may be employed separately or in combination with each other. The first method consists of the installation of ditch checks or weirs; and the second includes the lining of the drainage channel with an erosion-resistant material.

Since erosive action varies directly with the square of the velocity of the flowing water, ditch checks constructed of wood, corrugated metal, earth, rubble or concrete, and notched, can effectively reduce the velocity of the drainage flow thus greatly reducing the erosive action.

However, when the ditch grade exceeds five per cent, the cost of placing ditch checks may be prohibitive because of the increased number of checks necessary. The

best procedure in that case is to line the ditch with an erosion-resistant material such as stone, concrete, or semicircular corrugated steel ditch lining.

Study Problem Carefully

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

The proper and economical handling of large volumes of runoff water on heavy grades involves careful study for each and every location where the problem is encountered. Generally, the wider the ditch, the less the scouring force, but conditions of grade, soil, runoff, terrain, width of right of way, and the ownership and condition of adjoining properties govern.

Not only must the scour or the deposition of silt on the right of way be considered, but damage to the adjoining properties must be weighed in order to avoid claims. Ditches, by their very nature, give evidence of waters being diverted from their natural channels, and the parties who maintain such ditches are responsible for damages caused by the diverted waters.

Studies of such ditches should start from where the waters can well be discharged into a natural channel, preferably within the watershed where they originate. Pipes of adequate size with proper inlets provide almost foolproof carriers in congested districts, but are usually too costly for open spaces.

Where the runoff carries gravel or boulders, wide, reinforced-concrete ditches lined with hard brick or stone have lasting qualities with small maintenance costs. However, their original costs are high.

Well-founded check dams of concrete or treated timber on piles, spaced at proper intervals along the ditches, may have to be installed where the subsoil is alluvial in character and the adjoining properties must be protected from wash. Well-placed check dams of logs or brush may suffice in unimportant places.

Where damage to adjoining properties does not have to be considered, the use of riprap, either placed at random, or hand placed and grouted, may well protect the roadbed from wash and prove to be economical. Such protection is used extensively along very large ditches with substantial runoffs.

Treated piles or scrap rails driven on the roadbed side of big ditches at intervals of about three feet have saved many roadbeds from side scour where the grades are heavy and waters run deep.

How to Determine Generator Capacity

What factors establish the minimum engine-generator capacity for operating electric tools used in building construction and maintenance? How is the capacity determined from these factors? Explain.

Must Use a Safety Factor

By E. H. Ness
Supervisor of Work Equipment & Welding, Erie, Cleveland, Ohio

This problem of finding the minimum engine-generator capacity for operating electric tools in building construction and maintenance has confronted us many times and we use the following methods to solve it.

To determine the minimum generator capacity for a certain job, we must know the total wattage of all tools to be used at one time. Suppose, for example, that we are to use the following 100-volt electric tools:

1 electric drill	(2.6 amp.)
1 impact wrench	(5.0 amp.)
1 hand grinder	(6.0 amp.)

To ascertain the total watts required by these tools, we naturally multiply the volts by the sum of the amperes, which in this case is 110 x 13.6 = 1496 watts. Because of voltage losses in extension cords (cables), connections, and the possible inefficiency of generator and tools, etc., a safety factor of 20 to 25 per cent should be used to avoid overloading. On this basis the minimum capacity of a generator required for these tools would be 1800 to 2000 watts.

To determine the approximate horsepower required to operate a generator rated at 20 kw. or less we multiply the rating in kilowatts by 1.7. In this example, we have 2000 watts multiplied by 1.7 or 3.4 hp. needed to drive the generator. To prolong the life of a gasoline engine it is not good practice to operate it above 80 per cent of full load. This leaves a 20 per cent reserve of power to be used in an emergency. In this case, therefore, a gasoline engine with a minimum rating of 4 to 4½ hp. would be required to operate the generator needed to power our three tools at the same time.

Suit Capacity to Tools Used

By James J. Healy
Supervisor Bridges & Buildings, Boston & Maine, North Boston, Mass.

It has been generally agreed by the managements of railroads in this country that the equipping of B & B crews with a good assortment of power tools has contributed greatly to the economical operation of construction and maintenance projects.

There is enough difference of opinion on the effectiveness and adaptability of pneumatic tools compared with electric equipment to result in the conclusion that both types have a definite place in the annual work program based on the type and size of project, on the number and mobility of the crew and on other factors.

For the purpose of presenting the generator requirements for electric tools, I shall base the following views on an eight-man carpenter crew transported daily from headquarters to the work site by highway truck. This crew should normally be equipped with the following minimum list of portable, single-phase, 110-volt power tools: 1 — ¼-in. drill (1 to 2 amp. capacity); 1 — ½-in. drill (5 amp. capacity); 1 — ¾-in. drill (7.5 to 9.7 amp. capacity); 1 — circular saw (10 amp. capacity); and 1 — 500-watt floodlight.

The minimum generator capacity for a portable power plant for the crew should be sufficient to operate any combination of three of the above units. Although all these tools are all single-phase units, I believe the generator power plant should be a three-phase machine with a single-phase adapter plug.

How Oil Affects Imhoff Tanks

If waste oil should get into sewage-disposal facilities how does it affect Imhoff tanks? How often should such tanks be cleaned? Explain.

Causes Poor Operation

By H. M. Schudlich
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

Railway companies are now improving sanitary facilities for all classes of employees and many of these improvements are taking place in more or less isolated communities which do not have sewage-disposal facilities. The installation of such facilities usually necessitates the construction of one or more Imhoff tanks.

This unit can be contaminated with waste oil and grease. Grease produced by washing of employee's clothes, and fats, oils, and greases from lunchroom and other facilities, all contribute to contamination. Therefore, it is desirable that grease traps be installed in the sewer ahead of the Imhoff tank to reduce maintenance and cleaning costs. Grease, in itself, will not cause scum formation, but on mixing with the finely divided floating articles will form a stable scum which will be difficult to break up. The formation of gas will tend to raise this scum above the surface contributing to poor operation and a difficult maintenance problem. It is important to maintain properly a poorly functioning system, and careless operation of a sewage plant is uneconomical and can usually be dangerous from the viewpoint of sanitation.

Monthly inspections of Imhoff tanks are desirable for good housekeeping. At that time the scum should be broken up, but if there is considerable grease mixed with it, the particles that should sink remain in suspension. In the absence of grease it is possible to break up the scum and the sludge will settle and be carried into the sludge chamber for treatment. At this monthly inspection the walls should be scraped and the depth of the sludge measured. This is done by means of a board fastened at right angles to the bottom of a lightweight pole and the amount of resistance offered to the board indicates the depth of the sludge, which should not be allowed to accumulate to a depth of more than 12 to 18 in.

The solids collected in the bottom of the tank can be easily removed by pumping with a diaphragm pump, air dried and then buried or, preferably, they can be removed from the premises in a tank and buried in a shallow trench. When disposing of the sludge, it is recommended that it be buried at a fairly shallow depth at a place not readily accessible to human beings or animals. It should not be buried deep enough to contaminate a water supply, and under no circumstances should it be dumped into a lake, ditch or stream.

Rail Defects Within Joint Bars

Under what conditions should rails be inspected for defects within the limits of the joint bars? How often should such inspections be made?

Ultrasonic Testing Valuable

By C. B. Bronson
M. of W. Assistant to Vice-President, New York Central System, New York

The failure of rails within the limits of the joint bars has developed into a major problem, not only on our road, but on a number of others. The latest A.R.E.A. statistics on rail failures and control-cooled rail, shown in Bulletin 493 of February, 1951, indicate that nearly 40 per cent of all failures reported were within the limits of the joint bars. In our own case, up until about four years ago, failures of this type were quite limited in number. Then, starting in about 1947, they began to build up and have done so at an increasing rate over the past four years. Until the ultrasonic devices became available, which is only within the last year and a half or two, we had to rely on visual inspection made by removing the bars and examining the rails for bolt-hole breaks and head-and-web separations.

The magnitude of the problem indicates indirectly the answer to the first half of the question as to the conditions under which rails shall be inspected for defects within the limits of the joint bars. In other words, it developed into a matter of expediency. We are fortunate indeed that these ultrasonic devices became available at this opportune time. Our method of selecting locations for the inspection of rails within the limits of the joint bars is dependent upon where failures are showing up in service. Inspection locations have to be selected carefully because the number of joints that can be tested per day is limited. It has been stated that as many as four to five miles of track can be tested in one day, but in our experience that amount is never reached. Actually, the average is about half of this. This is far different from detector-car testing wherein 25 to 75 miles might be covered in one day. Thus, with ultrasonic testing being so slow, it is necessary to select for testing those locations where the failures within the joint-bar limits are most highly concentrated, although it would be far more desirable to have more out-of-face testing. What we actually do is to select sections of track from two to 10 miles long for the test work.

The results of ultrasonic testing have shown that about 85 per cent of the defects found are head-and-web separations. Of these defects about 77 per cent are 1 in. or less in length, and 21 per cent are between 1 in. and 2 in. in length. In the case of service failures of the two types, bolt-hole failures predominate by a ratio of about 6 to 1 compared to head-and-web separations. In other words, the situation is reversed in so far as any comparison between service failures and those found by ultrasonic testing.

The second question as to how often inspections should be made is a wide open one. With track-mounted equipment we are governed by a fixed or set program, but in the case of portable equip-

ment we can vary the period of time between testing on any individual stretch of track. For instance, if a few failures develop in service within a few months after a stretch of track has been tested, we can send the apparatus out for an additional check. This may be a matter of three or four months, or longer, dependent upon the record.

I do not know of anything of greater importance at the present time for a concentrated study than the problems incident to rail failures within the limits of joint bars. It is fully realized that the change in design of the A.R.E.A. rail section, as well as that of other roads, plus the change in bolt hole spacings, should have a decided effect in the reduction of failures within the limits of the joint bar. However, a long period of time will be involved before replacements will be made of large mileages utilizing the new designs and in the meantime we still have the problem of defects in our present sections. One disturbing feature of this is the fact that these failures are occurring in rail that has been in use only a matter of four or five years, although the spread of failures covers rollings going back many more years than this.

I again state that we are indeed fortunate that we have means now of detecting these failures with a fairly high degree of accuracy, without the necessity of making a laborious visual examination by removing the bars.

Inspect at 75 Million Tons

By A. D. Kennedy

Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

Any answer to the question under discussion will depend largely on local conditions. The purpose of making the inspection is to locate bolt-hole cracks and head-and-web separations. Although these types of rail failures are very common, fortunately relatively few have resulted in serious derailments. However, for obvious reasons, it is of great importance to locate these defects before ultimate failure.

Insufficient anchorage is one of the reasons for rail-end breaks, but without doubt the principal and primary cause is chargeable to worn joint bars. As to what degree bars are sufficiently worn to warrant inspection of rail ends is a matter which should rest with the supervisory forces because it is difficult, owing to the many factors that must be taken into consideration, to issue instructions that would cover all cases.

In my opinion, inspection of rail ends should be given serious consideration when the rail has carried 75 million tons of traffic. When rail-end failures begin to occur in any given location, all rail ends in these territories should be thoroughly inspected. After the need of rail-end inspection has been determined, further inspections should be made once a year thereafter.

To make such inspections, it was necessary, until recently, to remove the bars, a costly operation. However, devices are now available which may be used with a reasonable degree of accuracy to locate rail-end defects at a very low unit cost without disturbing the bars.

Make Spot Checks Annually

By P. H. Croft

Assistant Engineer M. of W., Illinois Central, Memphis, Tenn.

The conditions necessitating the inspection of rails within the limits of joint bars may be governed by several factors. Consideration must be given to the gross ton-miles handled over the track, the permissible speed, the type of traffic, the age of the rail, maintenance practices and numerous others. Many of these factors are so closely related that to attempt to set them apart would be difficult.

Track carrying heavy tonnage at high speed would require more

***IN CONNECTION** with track-raising and surfacing work on the Delaware, Lackawanna & Western, road crossings are dug out and resurfaced in many instances with an asphalt mix. This picture shows the asphalt at one of the crossings being compacted with a Wayer Impactor.*

careful and frequent inspection than that carrying a heavy tonnage at low speed. In the same class of track, the age of the rail would have considerable bearing on the need for inspection. In certain localities, a considerable portion of the traffic consists of service requiring refrigeration and if corrosion occurs from brine drippings it will be found that in many cases serious damage is being done to the area of the rail surrounding the bars and in that portion concealed by them. In locations of this kind it is advisable to make a spot removal of bars each year to determine to what extent the rail is being damaged. Rail corrosion can be kept to the minimum by the periodical application of a heavy coat of oil. A large number of railroads apply a heavy coating of grease to the insides of the bars and to that portion of the rail within the limits of the bars, when laying new rail. In some cases the bars are packed with a grease plug which should be forced back to the first bolt, forming a seal to prevent moisture from getting behind the bars.

It would not be practical to set up a schedule for the inspection which would be applicable to many locations. However, the plan now practiced on many roads, of using power wrenches to tighten the bolts once each year gives the supervisor an opportunity to make a spot check of his rail condition at that time by the removal of the bars. Where brine drippings or electrolysis occur or where conditions indicate excessive wear or corrosion, more frequent inspections of rail within joint-bar limits should be made.

How to "Clear" Rail-Laying Equipment

When clearing for trains, should rail-laying equipment be set off alongside the track or be run to the nearest siding to clear as a unit? What factors are involved? Explain.

Set Off At Work Site

By J. B. Kelley

Supervisor of Safety, Minneapolis, St. Paul & Sault Ste. Marie, Minneapolis, Minn.

For clearing trains in rail-relay operations the equipment should be set off along the track and not run to a siding. The time consumed in moving the equipment to and from sidings for clearing trains would result in drastically cutting production. On the other hand, by clearing on the job, maximum production is made possible because the men are kept busy longer in organized work.

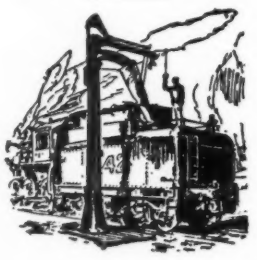
The clearing of trains by running equipment to permanent sidings does not usually work out as planned. The clearing is usually made for a particular train, but that train may sometimes be delayed, thereby keeping the equipment tied up on a siding for a longer period than anticipated. It is even more disappointing when the equipment must remain in the clear for an opposing run.

Cooperating as much as possible, the men of the rail crew keep busy, during the absence of equipment, by sorting and piling up small fastenings and scrap. However, other groups of the organization are provided for this purpose, and the best results are obtained only when that part of the crew assigned to the actual relay operation is kept at work on its assigned job a maximum amount of the time. This can only be done when the cranes and other power equipment are kept on the site of the relay work and the track is closed only long enough to let trains through. Under those circumstances, production activities can be resumed with the entire force quickly getting back into the duties planned for each of the men.

A further important factor in clearing the equipment on the job is the elimination of the personal-injury hazards involving the men operating the power units and stabilizing the loaded equipment for movement to and from the siding. One of the greatest dangers of such movements is the possibility of accidents occurring at highway crossings.

There are instances in which a heavy general-service crane is assigned to rail-laying work. Such cranes are too heavy to be set off at the site and must be run into sidings to clear trains. However, such a practice is undesirable.

For safety, a portable, on-track, self-propelled crane having a capacity large enough to handle a rail or the heaviest unit of relay equipment, is a necessity. The crane should preferably have a full-swing boom or at least one with a swing of 180 deg. If necessary the boom swing can be operated manually. The crane should be mechanically capable of negotiating temporary set-off skids with ordinary manual assistance. It should also be of such construction that it can easily set equipment weighing up to 3,000 lb. to the side of the track to clear for trains, or lift it to and from push cars, when equipment must be moved back to relay the opposite rail. This releases men from the dangerous job of loading and unloading compact 2500-lb. units by hand.



Run Cranes to Sidings

By John C. Rouse

General Foreman, Southern Pacific, Wells, Nev.

When working within 1½ miles of a spur or siding, "Burro" cranes should clear trains without setting off. The time it takes setting off and on will, generally speaking, be much greater than the time consumed in running to clear. The weather, the suitability of the ground for building a take-off, and the time it takes to build one all have to be considered.

It doesn't seem practicable to clear all the rail-laying equipment as a unit, because spike pullers will sometimes jump off the track when going through the turnout side of a spring frog. Rerailing them is a dead-loss of time. Furthermore, it would be necessary to put wheels under the adzers to take them any distance. The power wrenches and the machine for applying creosote behind the adzers would likewise have to be set off.

At present we are using, right behind the gages, a rail-end hardening unit mounted on a push car. Naturally, when the crane clears in a siding or spur it is faster to send this unit with the crane than to disconnect the air hoses and all the oxygen and acetylene tanks so they can be unloaded separately, and then reload everything when the Burro crane comes back. A push car on which is loaded two portable compressors to furnish air for the spike drivers follows the rail-end hardening unit. This, likewise, clears with the crane. Considering the time it would take to set off these last two pieces of equipment, it is worthwhile to run the equipment more than 1½ miles.

When the equipment gets into the clear, someone gets on the phone, keeping in touch with the foreman on the job site and with the train dispatcher. When these men again obtain the use of the track to lay rail, the men on the job pull spikes and remove bolts, getting a start for the various pieces of equipment ahead of the rail crane.

When it is eight or ten miles between sidings, there is no alternative but to set all the equipment off, including the crane. In this case, it is best to select a place for the set-off so it can be used for two or more days if possible.

Clear in Nearest Siding

By P. R. Matthews
Assistant Division Engineer, Chesapeake & Ohio, Ashland, Ky.

On the assumption that the rail-laying force is equipped with an on-track crane and a compressor, which are run into the nearest siding to clear the track, there are certain advantages to clearing all the other equipment in the same manner, instead of setting it off alongside the track, provided, of course, the grade is not too steep to make this method entirely impractical.

When rail-laying equipment is set off alongside the track, the usual procedure is to run the machinery on past the closing point after it has completed its job and set it off without interfering with the following operations. With the equipment set off in this manner, the various operations are delayed when starting to lay rail again, because the equipment has to be placed on the track and moved back to position behind the point where the track is to be broken.

By including "truck" cars in the proper position in the rail-laying outfit for loading the equipment, except spike pullers and trailer cars for the men, each of which is towed on its own wheels, the entire outfit can be pulled by motor cars and cleared as a unit with the crane and compressor. There is no material difference in the time consumed in loading and moving the equipment to and from the clearance point over the other method of setting the equipment alongside the track and running only the crane and compressor into the clear. However, the time required to break the track and have all the equipment working can be reduced 12 to 15 min. by the first method. This is possible because all the equipment is kept back of the starting point and each set of machinery can start work as soon as it is placed on the track without interfering with the other work equipment to be unloaded.

In addition to reducing the time to break track, the entire rail-laying force, including men and equipment, is moved to and from the layout points each day between close stretches of rail, and when closing the track for trains. The repetition in handling the equipment the same way each of these times gets the workers into good habits that further reduce the non-productive time.

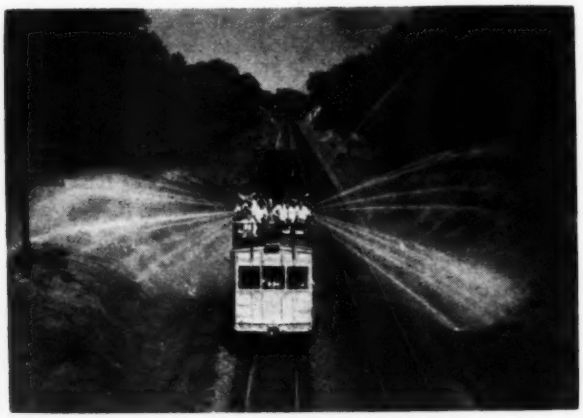
When the equipment is brought in at night instead of leaving it alongside the track it is usually placed near the camp cars. This permits mechanics to check and work on the equipment before starting time the next day, whereas in most cases this would not be possible if it were left in the country or at some out-of-the-way place alongside the track. Furthermore, bringing the equipment in permits the machines to be refueled before work time and eliminates a watchman for the equipment, whenever one is necessary, when the equipment is left at out-of-the-way points.

***WORLD'S LONGEST RAILS?**—The rails on which this train is running are each 19,812 ft. long, probably the longest in the world. Located on Elgin, Joliet & Eastern a few miles east of Joliet, Ill., these rails were made by joining together standard 39-ft. rails in an automatic oxyacetylene pressure-welding machine. The E. J. & E. began installing welded rail in 1943, and by the end of this year, will have 90 miles of track with continuous rail.*

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 675.)

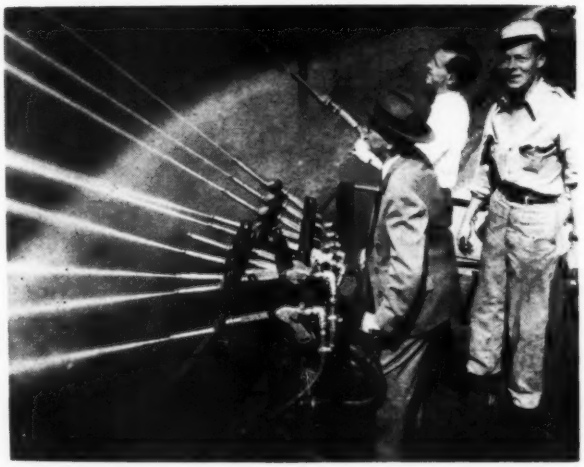


EQUIPMENT FOR SPRAYING WEEDS

THE R. H. Bogle Company, Alexandria, Va., has announced new spraying equipment with which weed-killing chemicals can be sprayed over right of way from fence to fence as well as over the roadbed itself. The company demonstrated the equipment recently on the tracks of the Southern near Alexandria before a group of railway maintenance men and other interested parties.

The spraying equipment, which is pushed by a locomotive while in operation, consists of a rebuilt box car with separate attachments for right-of-way spraying and roadbed spraying. Right-of-way spraying is accomplished by two "guns" mounted one on each side on top of the car. Each gun has 10 spray nozzles which can be operated all at once or in units of three. One can be operated by itself. These guns permit spraying weeds up to 60 ft. from the sides of the car. Pressure is provided by a Hale fire pump driven by a 115-hp. Chrysler engine. The pump and engine are mounted inside the car. The maximum speed of operation while spraying with the topside guns is 10 m.p.h. Under ordinary circumstances, however, speeds of 7 m.p.h. to 8 m.p.h. give the best results. A speedometer is located inside the car, and instructions concerning speeds may be relayed to the engine crew by a two-way telephone with amplifier.

Above, left — The R. H. Bogle spray car in roadbed-spraying service. Above, right—The car in right-of-way spraying service. Both views were taken during a demonstration on the Southern



Right—Close - up of spray-gun turret. Operating turret is J. B. Akers, chief engineer of the Southern. The other men are R. F. Plunkett of the Southern's test department, and J. B. Bogle

For roadbed spraying, the boxcar is fitted with boom-like pipes that can be swung out from the sides to cover a strip 12 ft. wide on each side. The chemical is sprayed from the pipes through nozzles spaced 2 or 3 in. apart. The movement of the booms is controlled from inside the car. Across the front of the car is another pipe which, operating in conjunction with the side booms, sprays the track on which the car is moving. While spraying the roadbed, the car can be moved at speeds up to 20 m.p.h.

The roadbed spraying booms will reach points far enough from the sides of the car for the guns on top of the car to take over. However, the booms and the guns

(Continued on page 730)

"THE BRUSH KILLING WORK THAT YOU DID FOR US IN 1950 HAS CONVINCED US THAT SUCH WORK OFFERS GREAT POSSIBILITIES TO SAVE BIG MONEY".

"With the arrival of the growing season this year I have been observing the benefits of the brush control work done late in the summer of 1950. Obviously this work could not have been justified unless the benefits extended into the growing season of 1951. I will say that these 1951 benefits have exceeded our expectations. We anticipate extending the work this year and we would like to have you get organized to arrive on our line with your spray equipment so that the work may be started some time after August 15th. We will move into new territory where we have plenty of brush and many young trees".

This comment coming from the Engineer, Maintenance of Way of an eastern railroad again confirms the importance of this new development for all railroads where control of brush is a yearly problem.

As a means of minimizing the work heretofore done by mowing, many railroads want to get started with this work early in the fall. We urge study of brush control work. We are willing to cooperate and provide service for even small test mileage.

May we exchange information on the subject with you.

READE TRACK ALIGNER

SAVES UP TO 50% IN TIME AND LABOR

This modern tool, the READE TRACK ALIGNER, takes the place of *eight men* using old-fashioned lining bars on track. Two men, each operating a READE TRACK ALIGNER, spaced a half rail length apart, can do an easier, better, safer job than a gang of ten men using bars and brute force. The tool does the heavy work, and minimizes chances of strains and personal injury to the workers.

Furthermore, no digging of tie ends is necessary with the READE TRACK ALIGNER, and track is shifted without humping or raising out of cross level.

Write for full details on this new tool, and let us demonstrate its advantages on your own track.

READE TRACK ALIGNER in working position, with holding fin inserted in ballast between ties, and jacking rack against base of rail; carrying handle is at front of jack.

After lining has been completed, lining bar has been removed from position in socket and carrying handle thrown to rear of jack.

With lining bar replaced in socket, operator pulls back on it to take strain off holding pawl; at the same time he steps on carrying handle to trip jack and release pressure on rail.

Jacking rack has returned to original position by spring action, and track aligner can now be picked up and moved to next location.

READE MANUFACTURING CO., INC.

Plants in numerous railroad centers

Executive Headquarters
135 Hoboken Avenue
Jersey City 2, N. J.

Service Headquarters
9500 Cottage Grove Avenue
Chicago 28, Illinois

For additional information on any of the products described on this page, use postcards, page 675.

cannot be operated at the same time. If a complete job of right-of-way spraying is desired, two trips over the same track are necessary.

The weed-killer solution is carried in a string of tank cars behind the car. Another tank car carries a reserve supply of full-strength chemical. All the pumping is done from the front or "sump" car. As this car becomes empty, a small pump inside the boxcar cuts in and refills the front car from those behind it. When the solution cars become empty, a pump on the car carrying full-strength chemical delivers the proper amount of chemical into the solution cars. They are then filled with water at the next standpipe.

The work crew for the train and the spray equipment will be furnished by the railroad. One employee of the R. H. Bogle Company will accompany the unit.

TRACTOR GEARS

A LOW-SPEED gear group for Caterpillar DW10 tractors, designed to improve the tractor-scraper performance of that machine, especially in pusher-loading earth-moving operations, has been announced by the Caterpillar Tractor Company, Peoria, Ill. Equipped with the new gear, the DW10, when engaged in pusher-loading scraper operations, can move at speeds that synchronize better with the speeds of pusher track-type tractors.

With the new gear group, the first gear speed of the DW10 is reduced from 2.8 m.p.h. This compares with a second-gear speed of 2.3 m.p.h. for the Caterpillar D8 track-type pusher tractor, and 2.2 m.p.h. for the D7 tractor. These matching operating speeds between the pusher tractors and the tractor-scraper unit are said to result in better loading efficiency.

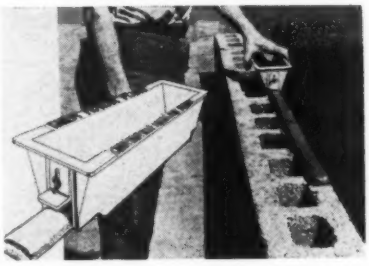
The new low-speed gear group also provides a greater potential tractive effort in self-loading operations. The remainder of the forward and reverse speeds with the new gears are the same as with the standard gear group.

IMPROVED MOTOR CAR FOR B. & B. GANGS

GREATER power without additional weight is the important feature of an improved heavy-duty motor car, called the Model 566F, which is now being offered by the Northwestern Motor Company, Eau Claire, Wis., for the use of bridge and building crews. Driven by a four-cylinder Ford tractor engine, the Model 566F has a power rating of 40 hp. compared with the 31.5 hp. developed by its predecessor, the Model 566W. Another advantage claimed for the new car is the fact that parts and service for the Ford engine can be obtained practically anywhere.

TOOL FOR APPLYING MORTAR

A NEW tool, called the Mortar Plane, for fast application of mortar to concrete or cinder block, has been developed by the Kakest Company, Curwensville, Pa. With



the device, the company claims, mortar can be laid four times faster than by the conventional trowel method and with 10 per cent less mortar waste.

The device is an open-topped container with an adjustable gate at each end. In operation the tool is placed on the line of blocks to be spread with mortar, then filled with mortar and drawn along. As the tool moves, the mortar flows out the gate on the end opposite the direction of movement and is deposited in a uniform ribbon. The tool is equipped with a guide which keeps it in proper line as it is moved along. Four to five blocks can be spread with one filling. The Mortar Plane is made of aluminum and, empty, weighs 1½ lb.

BREAK-RESISTANT MASONRY CUTTING BLADE

THE Clipper Manufacturing Company, Kansas City, Mo., has announced a new abrasive blade for masonry cutting, which, it is reported, can be dropped, twisted in the cut, or bent, all without damage. The blade, known as the Clipper "B-R" (Break-Resistant), is manufactured, in layers, of glass fiber cloth impregnated with res-

(Continued on page 732)

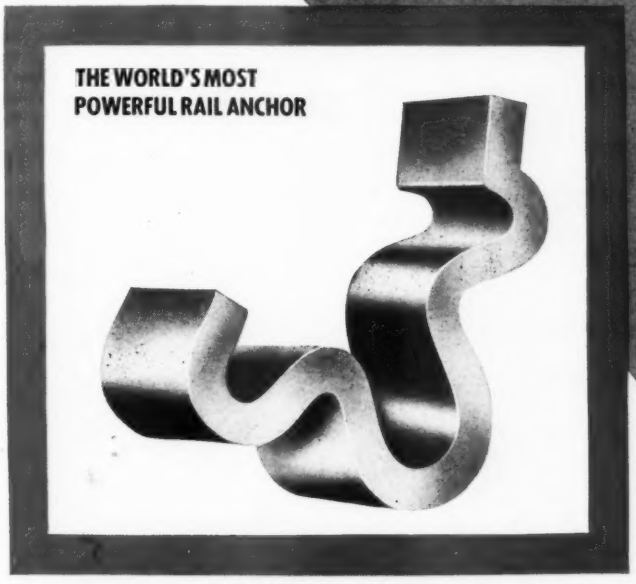
you want a considered estimate of rail anchor value

...ask your branch line supervisors!

A Branch Line Supervisor seldom gets new material. A recent survey among Branch Line Supervisors indicated a *decided preference* for the Woodings *ADVANCED TYPE* Rail Anchor!

WHY? Because they receive *used* material . . . and of the used rail anchors they receive, the Woodings *ADVANCED TYPE anchor always shows the highest re-application value!*

If *you* want a *considered* estimate of rail anchor value — *ask your Branch Line Supervisors!*



Woodings *ADVANCED TYPE* Rail Anchor

WOODINGS FORGE & TOOL CO.

CHICAGO • VERONA, PA. • ST. LOUIS

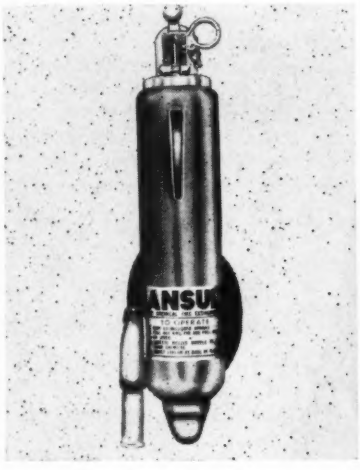
ins and silicon carbide. The layers are pressed together under hydraulic pressure and then processed in kilns.

The blade is most effective in cutting the softer materials, such as limestone, sandstone, light ag-

gregate concrete products and dry-press refractories, asbestos-cement sheets, etc. It is reported to be exceptionally efficient when used with small hand power tools under conditions where bending or twisting of the blade is common.

DRY-CHEMICAL UNIT WITH RUBBER HOSE

THE Ansul Chemical Company, Marinette, Wis., has introduced a dry chemical fire extinguisher with



a rubber hose. The new unit, known as the Ansul 4-B, is reported to be easy to operate, highly flexible in that either ground-level or overhead fire can be extinguish-

ed with it, and effective even in the hands of untrained personnel, because its discharge time has been increased.

The extinguisher is pressurized by a 1½-oz. carbon-dioxide cylinder in the dry-chemical chamber. The dry chemical is ejected through a self-closing nozzle in a fan-shaped pattern. The operating range is 12 to 15 ft. The Ansul 4-B has a capacity of 4 lb. of dry chemical. When fully charged, the unit weighs 10½ lb.

CORROSION RESISTANT ASPHALTIC COATING

THE Zone Company, Fort Worth, Tex., has announced a new asphaltic coating, called Dica-Rode, for

protecting underground pipe and foundations from corrosion due to earth acids and salts, and "stray" electric currents. According to the company, laboratory and field tests have shown that the material is practically unaffected by such common corrosive agents as nitric, sulphuric and muriatic acids. Hence, the coating is said to offer protection indefinitely. Another advantage claimed for Dica-Rode is that it can be readily applied cold on the job either by brush or spray.

Dica-Rode is manufactured in two forms, one with and one without long-fibered Canadian asbestos. The fibered material is designed for use on pipe lines. That without asbestos is more suitable for use on underground portions of concrete or steel foundation. Dica-Rode comes in 55-gal. drums.

THE MONTH'S NEWS

Railway Personnel

General

William R. Ware, roadmaster on the St. Louis Southwestern, has been promoted to assistant superintendent, with headquarters as before at Malden, Mo. He succeeds **T. M. Hutson,** who has retired after 50 years of railroad service. Mr. Hutson, before becoming assistant superintendent, was also a roadmaster.

George C. Vaughan, division engineer on the Pennsylvania, at Pittsburgh, Pa., has been promoted to assistant superintendent of the Southwestern division, with headquarters at Indianapolis, Ind., succeeding **L. A. Evans,** who has resigned to become vice-president and general manager of the Chicago & Western Indiana and the Belt Railway of Chicago.

George L. Morrison, assistant engineer maintenance of way and structures of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to vice-president and general manager of the Northwestern Pacific (a subsidiary of the S. P.), with headquarters at San Rafael, Cal.

Mr. Morrison is a graduate of Rice Institute. He began his railroad career in 1913 as a clerk on the S. P. at

George L. Morrison

Houston, Tex. After holding different positions at various locations, he became a rodman at Los Angeles, Cal., in 1922, and advanced through engineering and operating positions to become assistant terminal superintendent in 1941. Subsequently, he served as division engineer at Ogden, Utah, and Dunsmuir, Cal. He became assistant engineer maintenance of way and structures in 1945.

Paul E. Feucht, vice-president, Western region, of the Pennsylvania, and an engineer by training and experience, has been elected executive vice-president of the Chicago & North Western System, effective August 1.

Mr. Feucht was born at Indianapolis, Ind., on January 4, 1900, and, shortly after graduation from Purdue University with a civil engineering degree in 1923, entered railroad service with the Pennsylvania. Starting as an assistant on engineering corps of the Louisville di-

Paul E. Feucht

vision, he subsequently held engineering positions at several locations, and in 1934 became division engineer at Fort Wayne, Ind. Promoted to superintendent of the Wilkes-Barre division in 1935, he was appointed superintendent of passenger transportation, Eastern region, the following year, and in 1939 was advanced to general superintendent of the Southwestern division. Three years later Mr. Feucht was transferred to the Lake division at Cleveland, and in 1945 was further promoted to general manager, Western region, at Chicago, moving to Pittsburgh as general manager of the Central region in 1946. Ten months later he returned to Chicago as vice-president, Western region.

Edward W. Englebright, assistant to president of the Western Pacific, at San Francisco, and an engineer by training and experience, has retired. A native of Oakland, Cal., and a 1909 civil engineering graduate of the University of California, Mr. Englebright began his railroad career with the Southern Pacific at Dunsmuir, Cal., as assistant engineer, later served on the Union Pacific, and for seven years was engaged in development of a locomotive stoker business, which he sold in 1928 to join the W. P. as consulting engineer. In 1944 he was advanced to assistant to president. Mr. Englebright's post-retirement plans will take him shortly to Mozambique, Africa, on an E.C.A. assfgnment for the Portuguese government in connection with expansion of the colony's railroads.

Engineering

P. G. Savidis, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, retired on July 31.

(Please turn to page 736)

Railway Personnel (Cont'd)

Rexford E. Peck, who was recently promoted to bridge engineer of the Missouri Pacific Lines, with headquarters at St. Louis, Mo., as announced in the June issue, was born on October 5, 1895, at Idalia, Colo., and received his higher education at Highland Park College, Des Moines, Iowa, and the University of Denver, Denver, Colo. Mr. Peck was employed by Western Telegraph Company prior to February 1919 when he started his raliroad career with

Rexford E. Peck

the Denver & Rio Grande Western at Denver. Following service in various positions in the valuation and bridge departments on that road, he became associated with the firm of Harrington, Howard & Ash at Kansas City, Mo., in 1927 as bridge designer. In May 1928 Mr. Peck joined the M.P. Lines as assistant engineer on bridge design, in July 1938 became chief draftsman, bridge department, and in July 1946 advanced to assistant bridge engineer, the post he held before his latest promotion.

V. C. Blackett, assistant engineer in the engineering department of the Canadian National, at Moncton, N. B., has retired after 37 years of service with the road.

Alan E. MacMillan has been appointed assistant engineer in the division engineer's office of the Chicago Great Western at Olwein, Iowa.

Donald Collis, engineer on the Dominon Atlantic Railway at Kentville, N. S., has been appointed assistant engineer on the Algoma district of the Canadian Pacific, with headquarters at North Bay, Ont.

H. J. Fast, district engineer of the Northern Ontario district of the Canadian National at North Bay, Ont., has been appointed engineer maintenance of way of the Central region, with headquarters at Toronto, succeeding **J. W. Demcoe,** who has been promoted.

James R. Fraser, student engineer in the division engineer's office of the North Florida division of the Seaboard Air

Line, has been promoted to assistant to division engineer, with the same headquarters.

Albert J. Spaeth, assistant to chief engineer of the Reading, has retired after more than 41 years of service. **W. H. Eckenbrine,** who has been acting resident engineer since September, 1950, has been appointed resident engineer. **J. S. Reagan,** chief building designer, has been made assistant engineer of buildings.

C. J. Jaeschke has been transferred as division engineer to the Missouri Pacific's Wichita division, succeeding **R. M. Smith,** who has been transferred in the same capacity to the position formerly held by Mr. Jaeschke at Fall City, Neb. (Omaha-Northern Kansas divisions).

K. L. Clark, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, has been promoted effective June 16, to principal assistant engineer, with headquarters at Milwaukee, Wis. He will be in charge of converting the road's Airline yard at Milwaukee to a retarder hump yard.

After graduation from the University of Missouri in 1929, Mr. Clark joined

K. L. Clark

the Wabash, remaining in the employ of that road until 1934, when he became an inspector and engineer for the War Department on the Fort Peck dam project in Montana. He worked on that project until 1937, when he entered the service of the Milwauke as an instrumentman. Mr. Clark was promoted to assistant engineer in the same year, and to division engineer at Aberdeen, S. D., in 1942. He was transferred to the Chicago Terminals division at Chicago in 1947, and was promoted to assistant engineer in the general office at Chicago on October 1, 1950, which position he held until his recent promotion to principal assistant engineer.

Leonard E. Bates, engineer maintenance of way of the Atlantic Coast Line at Jacksonville, Fla., has been appointed assistant to chief engineer at Wilmington, N. C. **A. V. Hooks,** assistant engineer maintenance of way of the Southern

(Continued on page 738)

Railway Personnel (Cont'd)

division at Jacksonville, succeeds Mr. Bates as engineer maintenance of way there. Mr. Bates was born at Waycross, Ga., on November 18, 1903, and was graduated from the Georgia School of Technology in 1925 with the degree of Bachelor of Science in civil engineering. Entering railroad service in September 1925 with the A.C.L. as a rodman in the construction department, he served in various other engineering positions

Leonard E. Bates

until January 1, 1934, when he was promoted to junior engineer at Jacksonville. He went to Wilmington as assistant engineer in 1937, and was advanced to division engineer of the Southern division on December 1, 1943. Mr. Bates became roadmaster of the Wilmington district on February 1, 1946, and was promoted to engineer maintenance of way on March 24, 1947. His appointment as assistant to chief engineer became effective on July 1.

Robert B. Porter, who has been connected with the Tennessee Valley Authority at Knoxville, Tenn., and **Robert J. Grubbs,** a 1951 graduate in civil engineering from the Clemson Agricultural college, have been appointed assistant engineers in the engineering department of the Central of Georgia at Savannah, Ga.

W. M. Jaekle, construction engineer on the Southern Pacific, with headquarters at Sacramento, Cal., has been appointed assistant engineer maintenance of way and structures, with headquarters at San Francisco, Cal. He succeeds **George L. Morrison,** whose promotion to vice-president and general manager of the Northwestern Pacific is reported elsewhere in these columns. Succeeding to the duties of Mr. Jaekle is **G. J. Lyon,** senior assistant division engineer, at Portland, Ore., who has been appointed assistant construction engineer with headquarters at San Francisco. Mr. Lyon is succeeded by **H. K. Koberstein.**

R. A. Westergren, supervisor of structures on the Maryland division of the Pennsylvania, at Baltimore, Md., has

been promoted to assistant division engineer of the Philadelphia division, at Harrisburg, Pa., succeeding **W. R. Garner,** who has been promoted to division engineer of the Pennsylvania-Reading Seashore Lines, Atlantic division, at Camden, N. J. Mr. Garner succeeds **W. N. Myers,** who has been transferred to Cincinnati, Ohio, to replace **R. W. Riser,** who has been transferred to Ft. Wayne, Ind., where he replaces **C. E. Gipe.** Mr. Gipe has been transferred to the Pittsburgh division, at Pittsburgh, Pa., where he succeeds **George C. Vaughn,** whose promotion to assistant superintendent is announced elsewhere in these pages.

H. E. Amos, resident engineer on the Canadian National at The Pas, Man., has been promoted to division engineer of the Hudson Bay. Born in Winnipeg, Man., in 1905, Mr. Amos started his railroad career on the C. N. R. at Dauphin, Man., in 1918 as a checker in the operating department. The following year he was transferred to the motive power department as a call boy. He later moved to the engineering department as a rodman, and subsequently served as chainman, draftsman and transitman. In 1945, he was advanced to assistant engineer at Prince Rupert, B. C., and later served at Victoria, B. C., and Winnipeg. Last September he was transferred to The Pas as resident engineer.

F. E. Mayne, who has been promoted to division engineer on the Illinois Central, as reported in the July issue, was born at Dubuque, Iowa, on October

F. E. Mayne

4, 1913. He obtained his higher education at the University of Dubuque and at Iowa State College, receiving a Bachelor of Arts degree from the former in 1934, and a Bachelor of Science degree in civil engineering from the latter in 1936. Mr. Mayne started his railroad career in June 1936 as a section laborer on the I. C. at East Dubuque, Ill. Between February 15, 1937, and March 1, 1941, he worked respectively as a draftsman on the New York Central at Chicago, a rodman on the Chicago,

(Continued on page 740)

Railway Personnel (Cont'd)

Rock Island and Pacific at Rock Island, Ill., a chainman on the Yazoo & Mississippi Valley (Illinois Central) at Vicksburg, Miss., a chainman-rodman again on the Rock Island at Cedar Rapids, Iowa, and a chainman and later a rodman on the Y. & M. V. at Memphis, Tenn. Mr. Mayne was appointed assistant supervisor of track on the I. C. at Memphis on March 1, 1941, and was promoted to supervisor of track at Grenada, Miss., on October 1, 1942. He was transferred to Olney, Ill., on September 15, 1944, to Decatur, Ill., on June 1, 1945, and to Dubuque, Iowa, on July 15, 1947, where he was working at the time of his recent promotion to division engineer at Paducah, Ky.

Randolph K. Shortt, whose appointment as assistant division engineer on the Chesapeake & Ohio, with headquarters at Richmond, Va., was announced in the June issue, was born at Richmond on January 2, 1908. His early railroad experience was with the New York, New Haven & Hartford, where he began service on April 13, 1927, as a draftsman at New Haven, Conn. He entered the service of the C. & O. on May 20, 1929, as a rodman at Hinton, W. Va., and was subsequently promoted to instrumentman at Clifton Forge, Va. Following an absence from railroad service for 12 years, Mr. Shortt returned to his former position on the C. & O. in 1944. On November 1, 1945, he was advanced to resident engineer at Fort Spring tunnel, W. Va., and was later transferred to Clifton Forge and to Peru, Ind. He was serving at the latter location at the time of his recent promotion.

H. J. McNally, whose promotion to assistant division engineer on the Pennsylvania, with headquarters at Williamsport, Pa., was announced in the May issue, was born on June 6, 1914, at Philadelphia, Pa., and graduated with the degree of Bachelor of Science in civil engineering from Lehigh University in 1937. He entered the service of the Pennsylvania on June 21 of that year as an engineering apprentice at Wilmington, Del., and served in that capacity and as assistant on the engineering corps at Downingtown, Pa., Philadelphia, and Sunbury. On February 17, 1941, he was appointed assistant supervisor of track at Alliance, Ohio, and on November 5, 1943, was advanced to supervisor of track at Greenville, Ill. He was transferred to New Brunswick, N. J., on September 16, 1946, and remained there until his recent promotion.

Track

A. Cuomo, roadmaster on the Canadian Pacific at Sudbury, Ont., retired recently after 40 years of service.

H. L. Mitchell has been appointed supervisor of track of Subdivision 25, Ohio Central division, of the New York Central, with headquarters at Charleston, W. Va., succeeding **J. T. Fizer,** who has retired.

V. C. Hooper, roadmaster on the Canadian National at Port Arthur, Ont., has retired after 32 years of service, and **L. Olson,** roadmaster at Edmonton, Alta., has retired after 36 years of service.

A. G. Boa, general foreman on the Vicksburg division of the Illinois Central has been promoted to supervisor of track, with headquarters at Harriston, Miss. He succeeds **W. B. Harper,** who has been transferred to Vicksburg, Miss., to replace **P. Moyer,** who has retired.

Gordon T. Summitt, assistant roadmaster on the St. Louis Southwestern, has been promoted to roadmaster, with headquarters as before at Malden, Mo. He succeeds **William R. Ware,** whose promotion to assistant superintendent is reported elsewhere in these columns. Mr. Summitt began service with the Cotton Belt as a section laborer in 1923. Subsequently he served at various locations as section foreman and extra gang foreman. He was promoted to assistant roadmaster in April of this year.

J. H. Stevens, who has been appointed supervisor of track on the Illinois Central at Dubuque, Iowa, as announced in the June issue, entered the service

of the I. C. on May 18, 1930, as a laborer and machine operator. He was promoted to extra-gang foreman in March, 1940, serving in that position until May, 1941, when he entered military service with the 715 Railway Battalion. He was in action with that unit in Africa and Italy until November 28, 1945, when he was released from active duty, resuming his job as extra gang foreman on the I. C. Mr. Stevens was promoted to general foreman in November, 1950, in which position he served until his promotion to supervisor of track.

Bridge and Building

J. Oxenaar, bridge and building master on the Canadian National at Brandon, Man., has retired after 30 years of service.

L. B. Rasmussen, junior engineer on the Pennsylvania, has been promoted to assistant supervisor of structures on the Maryland division, succeeding **W. E. Meridith,** who has been promoted to supervisor of structures at Columbus, Ohio. Mr. Meridith succeeds **J. W. N. Mays,** who has been transferred to the Eastern division, at Pittsburgh, Pa., where he replaces **W. T. League.** Mr. League has been transferred to the Maryland division at Baltimore, Md., succeeding **R. A. Westergren,** whose promotion to assistant division engineer is announced elsewhere in these columns.

Special

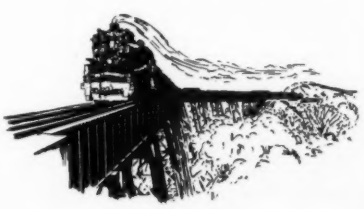
W. G. Chase, a head welder on the Chicago, Burlington & Quincy, has been promoted to the newly-created position of assistant supervisor of welding, with headquarters at Chicago.

M. E. Kerns, supervisor maintenance equipment on the New York Central, with headquarters at Cleveland, Ohio, has been promoted to superintendent, maintenance-of-way shop, with headquarters at Jackson, Mich. **C. W. Mitchell** succeeds Mr. Kerns as supervisor maintenance equipment at Cleveland.

Obituary

Walter F. Rippetoe, retired bridge and building supervisor on the Chesapeake & Ohio, died recently at Ronceverte, W. Va., at the age of 84.

Eugene Desharnais, retired roadmaster on the Canadian Pacific at Medicine Hat, Alta., died recently at the age of 87.



William E. Stenson, retired track supervisor on the Erie, died recently at Buffalo, N. Y.

Charles H. Hitchcock, retired engineer of grade crossings on the Reading, died recently at the age of 78.

H. Fraser, retired roadmaster on the Canadian National, died recently at Kindersley, Sask., at the age of 69.

Eugene G. Day, retired chief engineer of the Lake Superior & Ishpeming, died recently. Mr. Day, a graduate of the University of Maine, entered railroad service in 1905 with the Minneapolis & St. Louis. Subsequently, he worked on the Chicago & North Western for 28 years, then joined the L. S. & I. in 1937 as chief engineer, serving in that position until his retirement in 1947.

R. D. Pierson, regional engineer of the Coast Lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., died recently. Mr. Pierson began service with the Santa Fe in 1910 with construction forces on the Albuquerque division at Winslow, Ariz. He was named division engineer at that point in 1936, was transferred to San Bernardino, Cal., in 1941, and was promoted to regional engineer at Los Angeles in 1942.

Association News

Roadmasters' Association

With President Halverson presiding, the Executive committee of the association met at the Engineers' Club, Chicago, on July 9. After disposing of routine business the committee went to work reviewing preliminary drafts of the technical committee reports that are to be presented at the annual convention to be held at the Stevens Hotel, Chicago, September 17-19. For this purpose the chairmen of the committees had been invited to attend the meeting. Copies of five of the six committee reports were available for review, and the sixth one has since been completed.

It can also be reported at this time that plans are well along for the program of the convention. In addition to the committee reports several interesting addresses and discussions of subjects of current interest are being arranged. Tentative plans have also been completed for an inspecton trip, to take place on the afternoon of the last day of the convention, to the Elgin, Joliet & Eastern, where members of the association will have an opportunity to see rail being welded into continuous lengths by the Oxweld process, and also to see how the E.J.&E. is placing these long lengths in track.

American Railway Engineering Association

Two standing committees have scheduled meetings to be held in August. One is the Committee on Wood Bridges and Trestles, which will meet at association headquarters, Chicago, on August 20. The other is the Committee on Impact and Bridge Stresses, which will meet at the A.A.R. Central Research Laboratory, Chicago, on August 28.

At the time of going to press a total of seven committees have scheduled meetings to be held in September, of which five will hold their meetings at the Stevens hotel in conjunction with the concurrent conventions of the Roadmasters' Association and the American Railway Bridge and Building Association, September 17-19. These five committees include those on Rail, which will meet on September 18; Track, September 18-19; Highways, September 18-19; Records and Accounts, September 18-19; and Maintenance of Way Work Equipment, September 17-18. The other meetings scheduled for September

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 11-13, 1952, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren Street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting September 26-28, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual Meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

include those of the Committee on Water Service and Sanitation, which will meet at association headquarters, Chicago, on September 21, and the Committee on Wood Preservation, which will meet at the Netherland-Plaza hotel, Cincinnati, Ohio, on September 26.

Bridge and Building Association

A meeting of the Executive committee of the association, under the direction of President Huckstep, was held at the Chicago Engineer's Club on Monday, July 23. The principal purpose of the meeting was to review preliminary drafts of the eight technical committee reports that are to be presented at the convention that is to be held at the Stevens Hotel, Chicago, September 17-19. For this reason the chairman of the committees had been invited to attend the meeting. Also, preliminary plans for the convention program were discussed and the meeting was held over a second day when a joint session was held with the special committee that has been appointed to arrange plans for observance at the convention of the association's 60th anniversary. Another special feature of the convention will be an inspection trip, to be held on the afternoon of the last day of the convention, through the Underwriters' Laboratories, Chicago.

Supply Trade News

General

Fairbanks, Morse & Co., has started the construction of a new $7,500,000 plant near Kansas City, Mo., for the manufacture of engines and pumps. The new plant will be a one-story brick-and-concrete structure enclosing about 500,000 sq. ft. of floor space. When in operation the plant will employ nearly 1,000 people.

The sales and engineering functions of the Worthington Pump & Machinery Corp., have been moved from the company's Dunellen (N.J.) plant to its Harrison (N. J.) plant. The engineering functions of the section will continue under the charge of **J. F. Sebald,** and the sales function under **A. L. Jones.**

Personal

K. J. Weir, chief engineer of the W-M Corporation, Chicago, has been appointed to the newly- created postion of vice-president. **John H. Wylie** retired as secretary-treasurer of this company on June 30.

Robert Paxton, formerly vice-president in charge of manufacturing policy for the **General Electric Company,** has been

(Continued on page 744)

Supply Trade News (Cont'd)

elected an executive vice-president, to succeed **Hardage L. Andrews,** who has retired after 41 years of service.

Robert E. Huthsteiner, executive vice-president of **Cummins Engine Company, Inc.,** Columbus, Ind., has been elected president, succeeding **J. Irwin Miller,** who becomes chairman of the board. Mr. Miller succeeds **Clessie L. Cummins,** founder of the company, who has been named honorary board chairman.

At the recent annual meeting of **Poor & Co.,** the retirement of **V. C. Armstrong,** chairman of the **Rail Joint Company,** was announced. The position of chairman has been abolished, and **E. A. Condit** has been elected president and chief executive officer of the Rail Joint Company, and a vice-president of Poor & Co.

Carl A. Ten Hoopen, Sr. eastern district sales manager of the **Cyclone Fence** division of the **American Steel & Wire Co.** with headquarters at Newark, N. J., has been appointed assistant general sales manager of the division, with headquarters at North Chicago, Ill. **Joseph F. Boyce,** district sales manager at Waukegan, Ill., has been appointed Eastern district sales manager at Newark to succeed Mr. Ten Hoopen.

Robert M. Reindollar, Jr., has been appointed district engineer of the Philadelphia office of the **Portland Cement Association,** to succeed **George C. Britton,** who has retired. Mr. Reindollar joined Portland Cement in 1947 as field engineer in Pennsylvania and served in that capacity until November 1950, when he was appointed assistant to the district engineer, Philadelphia office. Mr. Britton will continue to serve the association on a part-time consulting basis.

S. D. Baumer has been appointed vice-president of the equipment manufacturing division of the **Air Reduction Sales Company.** Mr. Baumer joined the Airco general technical sales department in 1941 as a steel mill specialist and was appointed assistant manager of that department in 1944 and manager in 1948. **E. H. Roper,** formerly assistant manager of the general technical sales department of Air Reduction Sales Company, a division of Air Reduction Company, has been appointed manager of the department.

William J. Fleming has been appointed manager of the construction equipment sales division of the **Worthington Pump & Machinery Corp.,** with headquarters at Dunellen, N. J. **John S. Bachman,** with headquarters also at Dunellen, will continue in charge of field sales with the title of assistant manager. **W. Clifford Mumford** has been appointed manager of the vertical turbine pump sales division and **Fenmore E. Dunn** has been made assistant manager of that

division, both with headquarters at Harrison, N. J. **J. W. Hepburn** will continue as assistant manager of the division at Denver, Colo. **E. A. Murray,** assistant manager of Worthington's compressor division has been named manager of the divsion, succeedng **Herman H. Miller,** who will act as consultant to Mr. Murray. Mr. Miller, who has worked for Worthington for 50 years, plans to retire at the end of this year.

Lem Adams, vice-president of the **Oxweld Railroad Service Company,** a division of **Union Carbide & Carbon Corp.,** with headquarters at Chicago, has retired. Mr. Adams began his railroad

Lem Adams

career in 1908 with the Union Pacific. Subsequently, he advanced through various positions to that of chief engineer, which position he held at the time he resigned to join Oxweld in 1933.

Obituary

W. A. Peck, who was a representative for several railway supply companies, with headquarters at Chicago, until about January 1 of this year, died suddenly in Texas on June 23.

Clarence R. Johnson, 61, district representative for the western sales divison of the Caterpillar Tractor Company, died of a heart attack in a Sacramento (Cal.,) hospital on June 13.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 675)

Crawler Tractors – The International Harvester Company has published an eight-page folder presenting pictorially the fleet applications of International TD-24 diesel crawler tractors. The folder also describes the mechanical features of the TD-24.

Floor Resurfacer—The Dura-Tred Company is offering a bulletin presenting the features and applications of Dura-Tred Quick Floor—a plastic material for patching or resurfacing all types of industrial floors.

Mastic Flooring Underlayments—The Industrial Products Division of the Flintkote Company has issued a new four-page folder on mastic flooring underlayments, including both asphaltic and rubber types. The composition and mixture of asphalt-emulsion and rubber-latex binders are described, together with recommended practices in application of the materials.

Corrosion-Control Coatings—A 12-page bulletin presenting the characteristics, properties, uses, and methods of application of synthetic rubber-based corrosion-control coatings has been issued by the Casey & Case Coating Co. Included in the bulletin is information in regard to machinery enamels, damp-wall enamels, stucco-masonry coatings and floor finishes.

Tractor Equipment – The Trackson Company has published a new catalog, Form No. 1106, covering the complete line of Trackson equipment for Caterpillar diesel tractors. The products described and illustrated include Traxcavators (all sizes), pipe layers, earth augers, TracLoaders, swing cranes and land-clearing equipment. Specifications are given for each unit.

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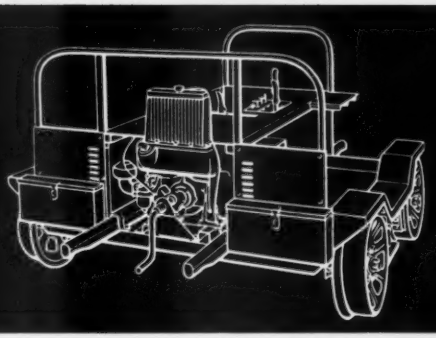

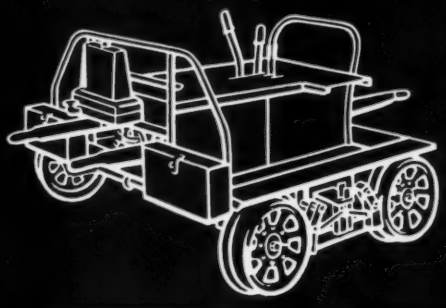

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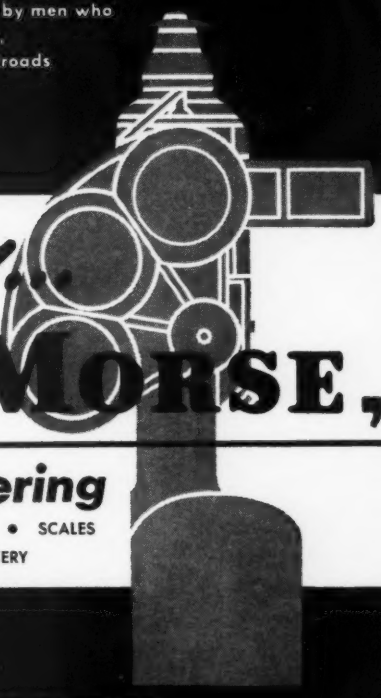

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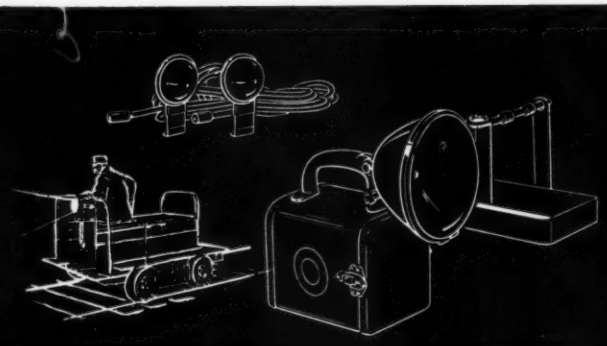

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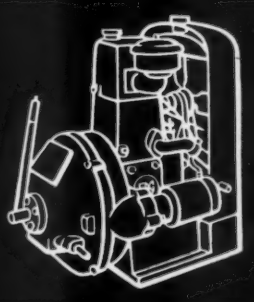

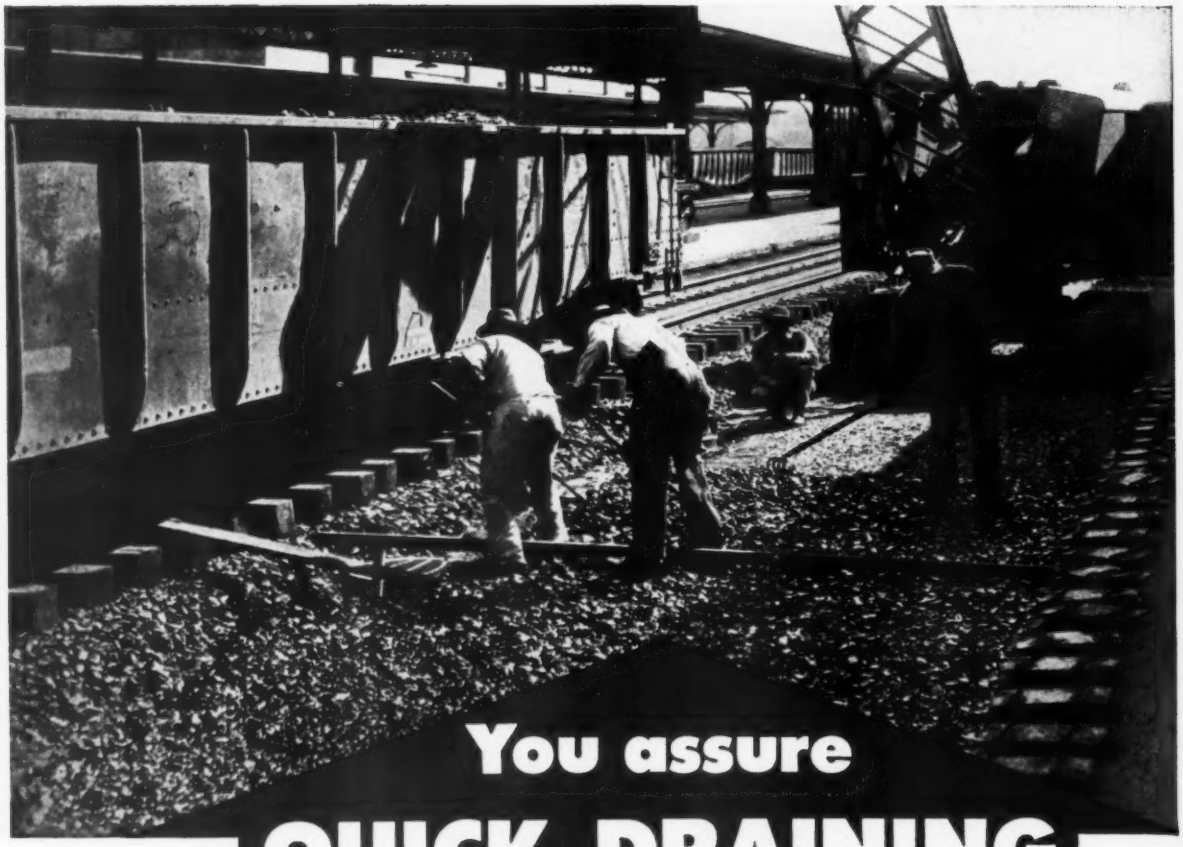

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